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Must Solve Shipyard Labor Problem

Divergent Views Held Regarding Best Method of Supplying Enough Skilled and Willing Workmen—This Question Requires Immediate Solution

THE battlecry of "ships, ships and more ships" is being relegated to second place. The new slogan is "shipwrights, shipwrights and more shipwrights". In the knowledge that the months-old campaign to get the shipbuilding program in full swing is imperiled by the insufficiency of skilled labor, a vigorous drive has now been started to supply the men needed. Success in these efforts to find the workmen has become an essential preliminary to the achievement of our shipbuilding program.

The plans now being carried out substitute organized effort to find workmen for the independent campaigns which the shipbuilders themselves, as well as various federal agencies and commercial organizations, have been waging. This fact inspires confidence in the success of the present drive despite the divergent views held by the men either in charge of the recruitment or qualified by their experience to analyze clearly the underlying fundamentals of the labor situation.

Educate Rather Than Augment Labor

J. W. Powell, vice president of the Bethlehem Shipbuilding Corp., pointed out before the senate commerce committee, for instance, that "labor has failed to grasp the necessities of the present situation. The spirit of American labor alone can win this war. Thus far it has failed materially to arise to the emergency and something must be done to change this attitude". He feels that conscription of labor will not prove the remedy, but that it is essential for "the government at once to organize and inaugurate a great campaign of education for American working men. They should be taught that the success or failure in this great emergency is up to them. They need to be awakened to the seriousness of the situation".

Yet we find Secretary Wilson of the department of labor asserting that not only is the supply of labor sufficient for our industries, but that the problem requiring solution is merely one of adjustment. And the director of the New York state employment bureau

says there is some shortage of workmen of large physique and also of skilled men, but that a surplus of other kinds of labor exists with considerable unemployment. To meet the situation, he states, big employers must initiate a plan for schooling labor.

The campaign now under way will furnish a test of Secretary Wilson's analysis—that the problem is one of adjustment.

Enrolling a Quarter-Million Reserve

He has inaugurated a nation-wide campaign for enrolling in the United States public service reserve, the recruiting division of the United States employment service, 250,000 men to satisfy the present and future needs of the shipyards. This reserve of a quarter of a million men is to be built up of every man in the country who combines skill in a mechanical trade used in shipbuilding with willingness to accept a job in a shipyard when notified.

To help the 3-week campaign, the department of labor enlisted the co-operation of the shipping board, the council of national defense, the food administration, and various private organizations. The work was carefully plotted, state quotas assigned, speakers lined up, and publicity agencies enlisted. It is explained that "the purpose of this national registration of all men fitted for and willing to work in shipyards is to eliminate the past demoralizing independent efforts to obtain shipyard labor". These efforts, it is pointed out, have resulted in the premature and unnecessary removal of workers from nonessential industries and the taking of men by one yard from another.

The shipbuilding program is closely interlaced with the labor situation. The present plan of Secretary Wilson should be thoroughly but quickly tested and as hurriedly extended or discarded, according to the results it gives. The country is thoroughly aroused to the need of building ships quickly and is determined to stamp performance after the prediction of Edward N. Hurley in these columns last month that "the ships will be built"!

Ship Labor Under the Microscope

Tonnage Depends Upon the Continuous Supply of Adequate Labor—Experts Analyze the Problem of Manpower Before the Senate Committee

What Men Who Know Say About Labor

PERSHING says, "Make a bridge of ships to France."

This bridge can never be constructed without the enthusiastic co-operation of a tremendous army of skilled American workmen incessantly busy in our shipyards. The riveting hammer has become more important in the war than the machine gun. The shipyard labor problem is paramount. This problem is discussed in all its phases for the first time in an authoritative manner in the following article. This story is not the result of the work of a single author. On the contrary it represents the joint efforts of a score of the leading shipbuilding experts of the country including such men as Homer L. Ferguson, president, Newport News Shipbuilding & Dry Dock Co.; George M. Andrews, general manager, New York Shipbuilding Corp.; J. W. Powell, vice president, Bethlehem Shipbuilding Corp.; Admiral Francis T. Bowles, manager, division of steel ship construction, Emergency Fleet corporation; Charles Picz, vice president and general manager, Emergency Fleet corporation; Meyer Bloom-

field, head, industrial service bureau, Emergency Fleet corporation; F. L. Sanford, Southern Pine Emergency Bureau; Otto M. Eidlitz, civil engineer and builder; Philip Hiss, chairman, committee on housing, Council of National Defense and Edward N. Hurley, chairman United States Shipping Board and president of the Emergency Fleet corporation.

These men collaborated in the production of the accompanying article through their testimony on the shipbuilding situation before the senate committee on commerce. This testimony, which covers nearly 900 printed pages, has been carefully read and thoroughly digested. The salient facts presented in this mass of evidence are set forth below.

The article, therefore, is worthy of more than ordinary study. It represents the consensus of opinion of the country's leading experts on what is undoubtedly the most serious problem with which the entire Allied world is grappling today.

CONSIDER the case at Sparrows Point. Sparrows Point shipyard in Maryland wished to increase its working force by 400 men to handle imperative government work. What happened? Eighteen thousand men were employed and 11,000 actually put to work before the necessary 400 steady workers were obtained. This is no fairy tale. The facts were recorded by responsible witnesses at the recent senate investigation of the shipping board and the Emergency Fleet corporation. A similar tremendous labor turnover exists in many of the 110 shipyards which are working to supply our crying need for tonnage.

Labor is the unknown quantity in the shipbuilding problem. Lumbermen guarantee sufficient timber for the Ferris type ships, steelmakers can furnish plates and shapes for the fabricated vessels, shops can produce the machinery as needed, sufficient ways are in sight on which to build and launch the fleet as planned; but where are the men to do the work? In his testimony before the senate committee on commerce, Homer L. Ferguson, president of the Newport News Shipbuilding & Drydock Co., says that one man working a year will produce 25 deadweight tons of an ordinary ship. To build 3,500,000 tons a year, which is the estimate set by some on the total production for the first year, would require at least 200,000 men. The most favorable estimates at this time give only about

150,000 men to all the shipyards of the country, and this number is a varying and unstable quantity. The problem of the Emergency Fleet corporation briefly stated is: Given the money, the yards and the materials, to find, develop and hold the labor.

The shipyards engaged in work for the government at this time, are located as shown on the accompanying map. In making contracts for ships, the Emergency Fleet corporation endeavored to make use of existing yards, but was forced by the magnitude of the undertaking to develop new yards in many cases. Facilities for launching, accessibility of materials and other economic factors made the matter a Hobson's choice. Many shipyards were located where their demand for labor and the high wages offered drew available help from munition works and other war industries. Cut-throat methods adopted early in the work developed a system of bidding up by which labor was the commodity for which rival shipyards offered exorbitant amounts. New yards just starting hired men by means of bonus offers from yards already in operation, and were in turn robbed of these men by higher bidders. At the instance of the Emergency Fleet corporation, these methods were abandoned by the contractors but foremen still waited outside the fences of rival yards to hire men. The result was a labor turnover of over 300 per cent and in some cases as high as 600 per

cent; that is, some shipyards had to employ three to six times their actual force during the year to maintain working strength. In one instance two tourist sleepers loaded with men were rushed under priority orders to western shipyards. They had no sooner arrived than representatives of eastern yards went out and hired riveters to return east. Shipbuilding labor, after it is obtained, has proved to be as elusive as quicksilver.

The labor to construct our merchant marine must be recruited to a great extent from outside the ranks of present shipbuilders. In the New England states there are a few of the old shipbuilders who are proficient in wood ship construction which had become almost a lost art. A number of yards were built in New England for wooden ship construction to make use of this labor. But the supply of really skilled ship carpenters of the old regime is exceedingly limited. To meet the needs of the fleet program carpenters who are familiar with bridge work, and other lines of heavy timber construction must be trained in work which is new to them.

In the steel ship work also there will be a tremendous infusion of new workmen. Ship riveters play the leading role in all steel ship construction, and in the present labor drama they demand and receive stellar salaries. With the wages at a high level, the difficulty is not obtaining men to attempt to work, but in obtaining men who are really good ship rivet-

ers. The character of the work demands some training before even a structural iron worker can be made a ship riveter. Building construction work is at a low ebb as a result of the war, releasing a great number of men who are available for steel ship work. Obtaining them, training them and holding them are the tasks before the employment managers of our shipyards.

The fabricated ship does not demand the amount of wharfside work which the more common type of steel ship would require. The fact that some of the riveting is done in the structural yards and plate mills cuts down the number of riveters necessary in the shipyard, but the number of men necessary even under the fabricated ship program will be realized from the emphasis placed on riveting by practical shipbuilders. It is stated that a 7500-ton ship requires about 700,000 rivets. The Union Iron Works, San Francisco, with a trained working force of 9600 has a record of from 250,000 to 300,000 rivets a week. It takes about three months to train a ship riveter, and he must be a man of muscular build to be able to stand up to the task.

Recruiting Ship Labor

To get the raw material from which to develop the ship construction army, that is, to find those men who are active and able to do the physical labor in the yards, the Emergency Fleet corporation has enlisted the aid of recognized quasi-government departments. Chairman Hurley has announced a plan for the establishment of a volunteer reserve army of 250,000 mechanics which will be drawn upon to provide manpower. The state councils of national defense have been asked to call for volunteers for this shipyard army. The United States department of labor has established employment agencies in every shipbuilding center and a campaign of advertising similar in scope to that which put across the Liberty loans has been set in motion through the press, poster service, the four-minute speakers and organized labor. Trained riveters, boilermakers, machinists, carpenters, caulkers, drillers, millwrights and common laborers are sought as well as the more highly trained men, skilled in actual shipbuilding. It is sought to enroll these men in the United States Public Service Reserve—a sort of war-labor reservoir which the labor department is creating to meet the needs of every war industry, but more especially those of emergency fleet construction. Independent shipyards automatically cease to be contenders for a limited supply

of human service. Uncle Sam becomes the one employer, the boss who does the hiring. A registration is being arranged by which each of the 48 states will be expected to supply a certain quota according to its density of population and industries. After the registration is completed

Is Labor a Slacker?

PROFITEERING and slacking are laid at the door of labor by many amateur critics of our shipbuilding progress. Such sweeping charges should not be made indiscriminately, for some responsibility rests upon conditions over which the workman has no control. This fact is supported by the following statement of Meyer Bloomfield, head of the industrial service department, Emergency Fleet corporation:

"I am as indignant against the industrial slacker as the question of the senator suggests. An industrial slacker today might as well be a Prussian for his effect on the shipbuilding program. But it is not true that shipyard employes on the whole are slacking. The problem of the absentee, of tardiness, is a serious one, and I have explanations to submit to this committee as to why men work only five days or three days, and why some men do not give a full week's output. I do not believe there is a man who could work six days a week at the hard labor of shipbuilding with the 'cards stacked against him', as they are in many of the communities, because we have not taken hold of the trolley cars, the ferry boats, the houses and the other facilities. You ask a man to work 10 hours at riveting. He stands up in a cold car that takes an hour to get him to his yard in the morning. He changes cars in some places. He goes through that performance again at night. It is impossible for him to be efficient."

every shipyard in the United States will notify the employment service when in need of men and the need will be supplied from the men who are registered. Unregulated competition will be eliminated and a distribution according to the demand will be made. The registration was chosen as the most practical way to bring together the "manless job" and the "jobless man".

To obtain these men does not solve the problem. The factors of training and continuous employment still re-

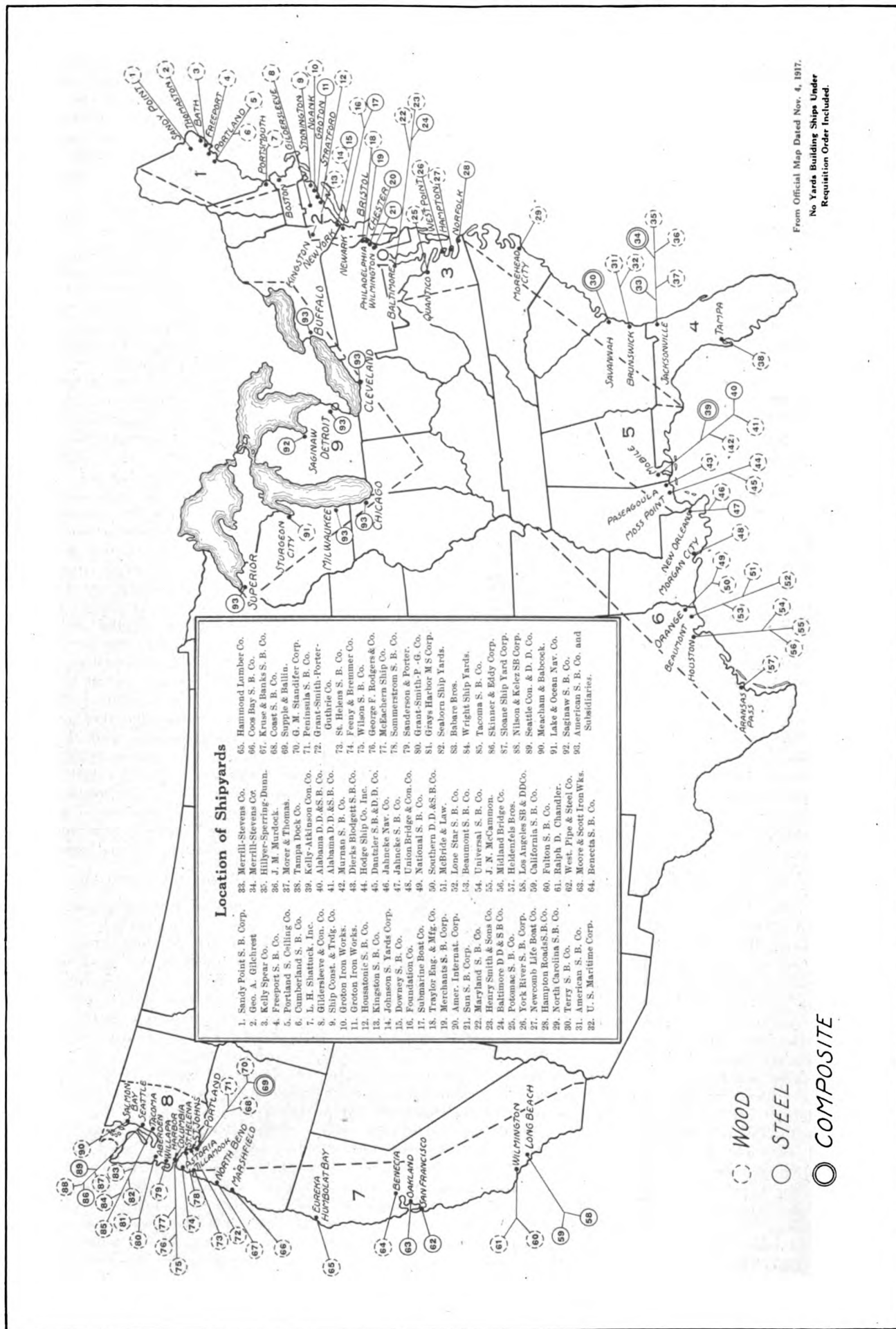
main unsolved. Doubling the force of men will not raise the possible tonnage production from its 1917 figure of 1,600,000 tons to the possible 1918 total of 3,500,000, or, as stated by J. W. Powell, vice president of the Bethlehem Steel Corp., even 3,000,000 tons. Labor untrained does not become an asset. A reserve of 250,000 green laborers would be as useless as Bryan's over-night million for defense.

The Emergency Fleet corporation has realized the need for a nucleus of trained shipyard workers. In no trade is actual practical work more necessary than in shipbuilding, and practical instruction follows upon example rather than precept. As a normal school course develops teachers, so must trained ship men be developed and the system adopted resembles closely the highly specialized normal system. The best trade instructors in the country have been engaged for months in training men picked from the ranks of existing shipyards. They have been teaching these picked men to teach. The Newport News Shipbuilding & Drydock Co. graduated 75 men from this normal course in early January and another hundred men were under training. These men were selected under conditions similar to those which governed the selection of our student officers in the training camps. They were chosen for their alertness, perception and personality. The men appreciate the fact that they are serving an apprenticeship, and that they are learning to fight as truly as the men who are called to drill by the daybreak reveille. The instillation of this spirit—this morale—is not the least of the factors which make the trained worker a national asset.

Using the Instructors

The plan of training is on a practical basis. Each man who enters the normal school of shipbuilding is paid his usual wages by his employer while under training. The government reimburses the employer to the amount of \$5 a day, and as a further consideration, the student instructor agrees to remain with the employer by whom he is certified to the school for a period of six months after he completes the course.

The nucleus of instructors provided by this plan will be used to develop other teachers and to furnish practical instruction. As new workmen come into the industry they will be filtered into the work under some scientific plan which will admit of their instruction in the lines to which they are found to be best adapted. Specialization will be fostered. While that perfection best typified by the



standardization of processes in the motor industry will not be possible, the fitting of the man to the job for which he is best qualified will be sought.

Returning again to other factors which have a bearing on the labor problem, that most troublesome element of keeping the men at work remains unsolved. Men may be hired, tested, trained and directed into the channels of shipbuilding where their efforts will count for production. But they cannot and will not be tireless machine-like units. The human equation, perplexing in its simplest form becomes most involved under existing shipyard conditions. Managing a temperamental diva would have no complexities to the builder who can successfully manage those workers who have heeded their country's call for more ships. Strikes, labor shifts and the conventional day off all add their burden to the sorrow of the shipbuilder; but the greatest of these is the strike.

Strike Menace is Serious

Reports from 106 shipbuilding companies that have contracts with the Emergency Fleet corporation show that there have been stoppages of work in 30 different companies since the war began. The number of days actually lost amounts to 596,992 working days. This means that nearly 20,000 men were off duty on account of strikes for 30 working days. The causes of these strikes in the order of their importance were: Wage disputes, hours of labor, living conditions and union quibbles, such as unfair material, etc. An analysis of the strikes gives the following as the relative causes:

Cause	No.	Per cent
Wage question	61	72
No reason assigned	13	15
Sympathy	4	5
Unfair work	3	4
Wage and working conditions ..	2	3
Open and closed shop and wage ..	1	1
	84	100

An example of the difficulty experienced in adjusting the wage question is found in the metal trades in San Francisco. The unions and the companies entered into an agreement on Aug. 1, 1916, fixing the wage scale for a period of one year. Difficulties arose and the men demanded an increase of practically 50 per cent by reason of the increase in the cost of living. A wage-adjustment board after careful study found that their living had increased to about 31 per cent, but it was obliged to grant a raise in wages equivalent to about 40 per cent. As an additional concession a 10 per cent bonus was offered to those who worked six days

every week, and this bonus became a permanent increase in February this year.

The bonus system to secure full-time work offers some interesting features. The Emergency Fleet corporation agreed to pay a 10 per cent bonus on many of its contracts believing that the speed secured would warrant the expenditure. It is estimated that the bonus to labor on the total of \$1,300,000,000 ship contracts to date would be about \$65,000,-

Get the Men

"MONSTROUS" is the term used by Charles Piez, vice president and general manager of the Emergency Fleet corporation, to characterize the fact that our shipyards are working only one shift a day for six days a week. Mr. Piez summarized the situation, and emphasized the responsibility of labor in his statement before the shipping inquiry on Feb. 6, saying:

"The shipping board has the necessary yards, materials and the money. We now have sufficient shipways, 326 for wooden ships and 414 for steel. All that is lacking is a spirit in the nation that will send a quarter of a million American mechanics into the yards to give the best and most efficient work. If we keep ahead of the submarine campaign we must run three shifts a day, 52 weeks in the year. Just as the navy is the first line of the British empire and just as Germany depends upon her submarines, so must America depend for victory upon the shipbuilders in American yards."

000. The additional cost would, of course, depend on all labor working full time, and unfortunately this condition does not exist. A great many young men, men without families, are in the industry, particularly as riveters. Four days a week at the present high rate of pay gives them a surplus for their needs, and they content themselves with a minimum of active work. In many cases four days constitute a week's work for them. This habit is particularly damaging as each riveting gang includes a riveter, a holder-on, and a boy or helper. Thus the workman who has the time-off habit actually prevents others from giving full-time efficient service for he disrupts a working organization of which he is a unit.

It must be said in fairness to the workmen, however, that many of the

earlier disturbances resulted from the belief that the burden of increased wages fell upon the ship contractor and that all shipbuilders were profiting enormously under present conditions. In reality, each wage raise under most existing contracts becomes an additional burden on the government, as it was necessary, due to unstable conditions, for the Emergency Fleet corporation to agree to this contract clause. Wage arbitration is not compulsory upon either the unions or the contractors, but the corporation holds the whip hand by the fact that the power to increase or decrease wages lies solely with it.

Varying Wages Cause Trouble

The greatest evil of the wage condition has been the variation in wages between different centers. A good many of the strikes and difficulties that have existed in the past eight months have grown out of the increases in wages given by one company to get men away from other companies. When the wage scale expired in Seattle during August, 1917, the unions made a demand for a large increase in wages. One company granted the demand and most of the men of other companies went on a strike. This resulted in a production record for one plant and a loss in time to all the others. The correction of the variable wage lies with the shipping board and the means proposed consists of a zone system of wages which will be binding on all parties. It has been suggested that a wage-adjustment board shall establish a wage scale which will be binding throughout a given zone and shall be that which governs at the nearest navy yard. This standard shall not be deviated from by any manufacturer or builder working on government contracts. This should prevent the stealing of labor and lessen that shifting from one class of work to another, which has proved to be such a problem in holding men at shipbuilding employment.

The question of hours of labor should have skilled attention, as it has been proved that overtime after a certain limit varying with the kind of work results in impaired efficiency. Sixteen per cent of the men employed on shipbuilding are on a 10-hour schedule or more; 31 per cent on a 9-hour schedule; and 53 per cent are on an 8-hour schedule. Where yards are in continuous operation with two or possibly three shifts the necessity for overtime is obviated, as the succeeding shift can handle any urgent uncompleted work left by an earlier gang. However, where labor is scarce, and where continuous shifts

are impossible, the efficiency is further impaired by the necessity of overtime. Overtime cannot be avoided in the present pressing emergency. The different parts of ship construction are so interdependent that if progress is delayed awaiting the completion of some part, that part must be completed by overtime work. Overtime in addition to reducing individual efficiency rapidly increases the cost of labor. When 8-hour men are obliged to work 10 hours, they draw pay for 11 hours. This constitutes a fixed charge against the cost of construction. But their impaired efficiency is a variable charge extending, perhaps, over the output of the next period in which they are employed, and the greatest loss comes in the wasted man power distributed over the entire work.

"Conscript 'Em and Make 'Em Work"

To the strap-hanger strategist and the corner-grocery debater, the question of holding the men on war work, particularly in the shipbuilding lines, seems easy. Their advice would be most direct, and would be supported by hot argument based on the selective service bill which has raised our army. If shipbuilders wished to strike, or if they would not enter the work, or if labor shifting and a constant turnover was encountered—the first solution offered by those who would run the war "as it should be run" would be "conscript 'em and make 'em work".

The one consideration which makes the conscription of men for shipbuilding impossible is the fact that by labor conscription one man is singled out, set apart from his fellows and told he must work. In the selective army draft, men were taken from all stations and walks of life; the farmer, the miner, the clerk, the mechanic, and the idler were grouped with the one purpose of getting an army in the quickest time. The operation of the law was successful because it was just and because it was upheld by united opinion. In conscripting shipyard labor, the problem would assume a different light. There is no question of the actual right of the nation to take that talent of labor which would expedite the shipping program. The need is acknowledged and the legal right is granted; but the difference in public sentiment in the two cases makes compulsory labor impossible. Strenuous resistance would meet every effort to compel workmen to enter private shipyards even were the work entirely government controlled and for government service. The feeling of discrimination among those trades which were compelled

to work would minimize the effort obtained under compulsion. If we had some system whereby every able-bodied man within certain age limits was compelled to take up some active war service, and from this universal army certain workmen were set apart for shipyard work, conscription would be the solution of the entire question of labor. We take soldiers and sailors against their voluntary will to fight our battles, and public sentiment not only approves but applauds the plan. If we undertook to apply the same

Labor Secretary Speaks

Only fairly satisfactory returns are coming in from the coast-to-coast campaign under way to enroll 250,000 skilled artisans in the United States public service reserve.

The filling of the reserve is a vital war necessity and it is believed the somewhat unsatisfactory reports are due to confusion over just what is being attempted. To clear up the confusion, Secretary of Labor Wilson has called particular attention to this statement:

"It should be distinctly understood that in its campaign for shipyard volunteers, the public service reserve of the department of labor is not calling for men for immediate employment. Only men of special types are needed at the shipyards today.

"The purpose of the reserve is to enable the shipyards to get just the kind of men they want when they want them, and it wants every working man to stick to his present job until the department of labor tells him when and where he is wanted. The registration of a large reserve is necessary that the department may get men of requisite skill and avoid putting any unfair burden on any employer or industry."

methods to securing labor for war work which is just as necessary, but not nearly so dangerous, we would face serious objection from such numbers that the government would be powerless. The difference may be psychological, or it may be purely sentimental, but it most certainly exists.

Why Housing is Important

The living conditions of the worker must receive consideration. That skilled workmen require careful grooming to produce maximum results is a fact recognized by every progressive manufacturer. The housing conditions surrounding our large shipyards have been complicated by the fact that other large war industries were in existence or have been established in the same localities.

Smith, Jones and Brown, three firms in one of our typical centers received huge orders for shells and munitions early in the game. In the

same locality the Emergency Fleet corporation let contracts for ships to Robinson, Clark and Green, established shipbuilding concerns. High wages and labor premiums, or bonus offers, soon led to a readjustment—a shifting of labor. New workmen were attracted from other communities. Rents skyrocketed, property advanced in price, and real estate owners were prosperous, but there was no new building construction, due to high prices and labor shortage. The result, typical in 20 to 25 of our shipbuilding centers, was that housing conditions became unbearable.

Poor Housing is Depressing

Consider the matter from the standpoint of Jeff Swanson, structural iron worker from St. Louis. Jeff was a workman with an artist's sense of pride in his work. He was steady, reliable and enjoyed the staccato thrill of his riveting hammer high above the streets of the city. He worked full time, was content with the robust satisfaction of the man who toils with his hands and has a comfortable home.

The war came and upset Jeff's cycle of existence even more than it had been shaken when the McNamara boys were rushed across the continent to stand trial for the Los Angeles dynamiting. Building construction tapered off as prices advanced and as capital was absorbed in active war work. Jeff was fortunate in having his home paid for and savings sufficient for the needs of his family.

The call for shipyard riveters appeared as a saving opportunity. Jeff left his family and went to New York. He readily found employment in a shipyard near New York but was unable to find a room within access of his work. It was necessary to go across to the city to live and make the journey each day by ferry and street car. Ship riveting is hard work. Jeff worked only eight hours, but to this was added an hour and a half each morning and evening, the time which it took him to reach the shipyard, and to return to his room. This was complicated by the long wait in the evening when crowded street cars passed one after another. Added to these discomforts was homesickness. Jeff craved the comfort of his family. Is it surprising that he gave up the good wages at the shipyard and turning his back on his country's call for riveters, returned to St. Louis to odd jobs and perhaps idleness?

This does not picture an exceptional case. There are thousands of Jeffs to be found along the Atlantic seaboard. Housing facilities for the

enormously increased army of labor is one of the most perplexing problems which has confronted the Emergency Fleet corporation, the army, and the navy. All three have come into competition in several instances.

At Newport News the existing shipyard was engaged in routine navy construction when confronted with the emergencies of the enlarged destroyer program and the demands of the government for troopships and oil tankers. As it increased its force for these added burdens of ship construction the army made Newport News a point of embarkation. Cantonments were constructed to house the soldiers assembled at this point, but the officers of the assembled divisions were obliged, through necessity, to seek homes in the city. The navy, the army and the shipbuilder were forced into competition for a scanty supply of available quarters. Soon, Mr. Ferguson stated, "it got to a point where a blacksmith was pushed out into the street".

The shipbuilding company had already built 52 or 53 houses for its colored men, as well as a cantonment which would house 250, but it was forced into a situation whereby houses were built and persons not employed in the shipyard occupied them. The secretary of the navy provided \$100,000 with which a hotel, dining room and kitchen were constructed to take care of 300 men, decently and comfortably. But these measures only marked a start. They

did not begin to alleviate the situation.

Shipyard owners and other manufacturers on war work are not in position to solve the housing problem. They must first take care of the enormous expansion of their own plants. Private capital is not available because of the uncertain returns, and it is doubtful if banking aid could be obtained to swing housing construction even at the mounting commercial rates.

Where Houses are Needed

A few concrete examples taken from Chairman Hurley's memorandum to the senate committee on commerce will furnish some idea of the magnitude of the undertaking. The Hog Island shipyard, nine miles from Philadelphia will present the largest problem. About \$10,000,000 will be necessary to erect thousands of homes for workmen. A large community center is being constructed to handle the situation, which is complicated by large munition industries and other shipyards. Sparrows Point near Baltimore, Md., has an acute problem as may be noted from the labor turnover mentioned at the beginning of this article. Chester, Pa.; Wilmington, Del.; Newport News, Va., and Newburgh, N. Y., all need aid in housing and caring for their workmen on ship construction. Other points, such as Erie, Pa., need assistance in housing men employed in industries closely allied to shipbuilding. The entire estimate of financial assistance

approaches a total of nearly \$50,000,000.

A committee has been appointed by the secretary of war to co-operate with the Council of National Defense in investigating the housing problem. A plan for alleviation has now been proposed.

Under this plan, a central authoritative board is suggested with power to commandeer materials as well as such otherwise useless property as summer cottages unoccupied through the greater part of the year. This central board, it is recommended, should have the further power to design and construct buildings to operate and manage communities, and to maintain standards of well being both within the plants and in housing centers. A commission is proposed to study the final disposition of the properties acquired and constructed.

The suggestions, as summarized, entail advances by the government of sums up to 80 per cent of the value of property created. Local companies are to be encouraged to handle the remaining 20 per cent. A blanket mortgage on each separate proposition is proposed to protect the government's investment, giving the local corporation title to the property subject to the lien of the government. The plan includes a dividend provision and an amortization scheme returning the government's funds on the basis of 4 per cent per year for 15 years, at the end of which time the property is to be assumed by the local company or by the occupant.

Predicts U. S. Will Take Britain's Place

THE policy followed by the United States government in commandeering ships is being used by critics of the British government's policy, as an example of what the authorities should do. *Fairplay*, a British magazine, points out that a number of shipowners, whose individual initiative developed the British merchant marine before the war, are retiring from the business as government restrictions not only involve present hardships, but indicate the continuance of such control for some years after peace has been concluded. This magazine sees in the retirement of these men the loss from "the shipping trade of those who have helped to make it what it is and whose abilities are an asset."

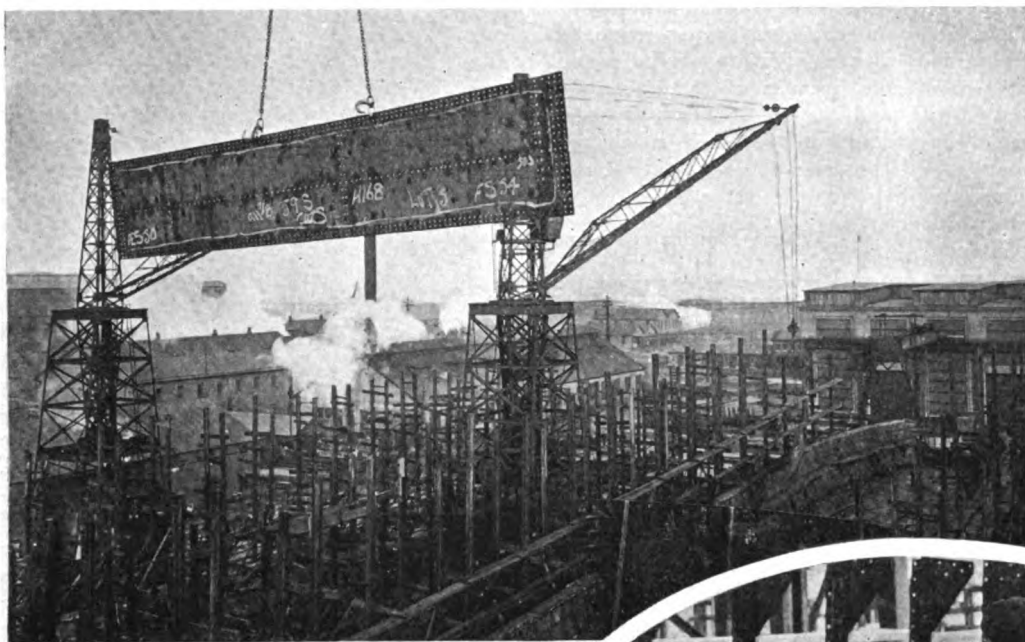
"Why cannot they take a leaf out of the policy of the United States?" it continues. "In America an entirely different official attitude is adopted, with the consequence there is every reason to fear that after the war the place once occupied by this country will be filled by shipping under the Stars and Stripes, and that our mercantile marine, of which

we were so proud, and which made England what she is, will gradually disappear, as the noble fleet of the United States did after 1861. While our shipowners are receiving about six shillings or seven shillings per ton deadweight per month for the hire of their tonnage by the authorities, it is announced that the United States government will give their requisitioned cargo vessels the following rates: For 10,000 tons, \$5.75 per ton deadweight per month; 8001 to 10,000 tons, \$6; 6001 to 8000 tons, \$6.25; 4001 to 6000 tons, \$6.50; 3001 to 4000 tons, \$6.75, and 2500 to 3000 tons, \$7 will be paid. Vessels exceeding 11 knots speed are to be allowed 50 cents per ton for every knot or fraction of a knot over 11 knots, while passenger steamers of 10 to 11 knots, with accommodation for over 150 passengers, will receive \$9 a ton; 12 knots, \$9.50; 13 knots, \$10; 14 knots, \$10.50; 15 knots, \$11, and over 15 knots, \$11.50, and for passenger steamers with accommodation for from 75 to 150 passengers the following rates will be paid: Ten to 11 knots, \$8 a

ton; 12 knots, \$8.50; 13 knots, \$9; 14 knots, \$9.50; 15 knots, \$10, and over 15 knots, \$10.50. Further, where the steamers are taken over and manned and operated by the navy, \$4.15 will be paid for cargo boats and \$5.75 for passenger boats of 11 knots speed, with an additional allowance of 50 cents a ton for each knot in excess of 11 up to 16 knots.

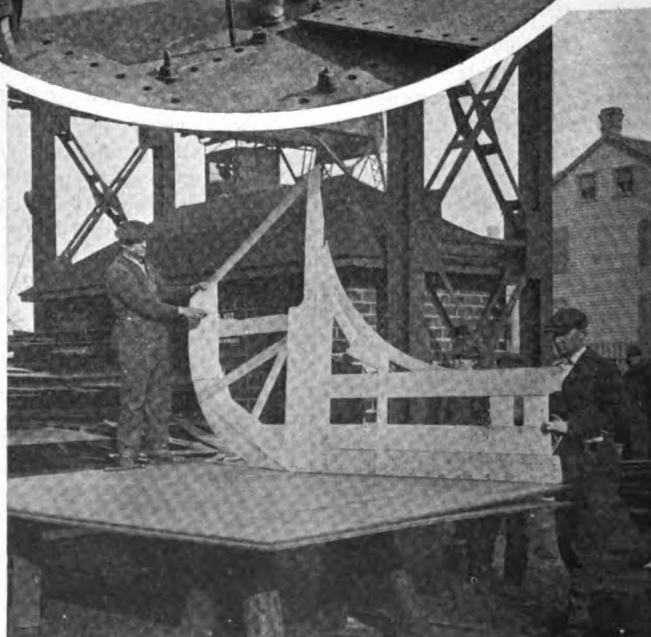
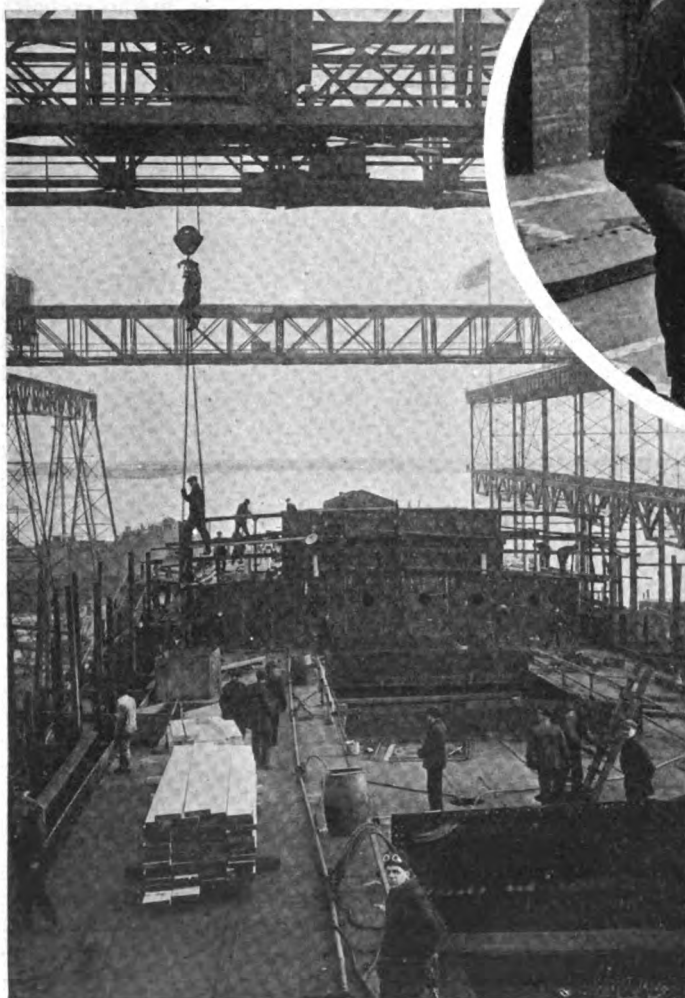
"And those rates only, as it were, mark the beginning of America's foresight, for while the British government does nothing to meet the increased expenses, the government of the United States definitely announce that they will 'examine carefully the results of the operations under the rates, and will determine on any revision that appears to be necessary for fair treatment of the vessels' owners', and that 'revisions will be made, if found necessary, at intervals of not more than 90 days.' The American government is doing all in its power to stimulate the energies of those most capable of giving their country what it lacks.

Troop and Cargo Ship Construction



Steel Tower Twirlers are Used for Handling the Materials Required in Ship Construction.

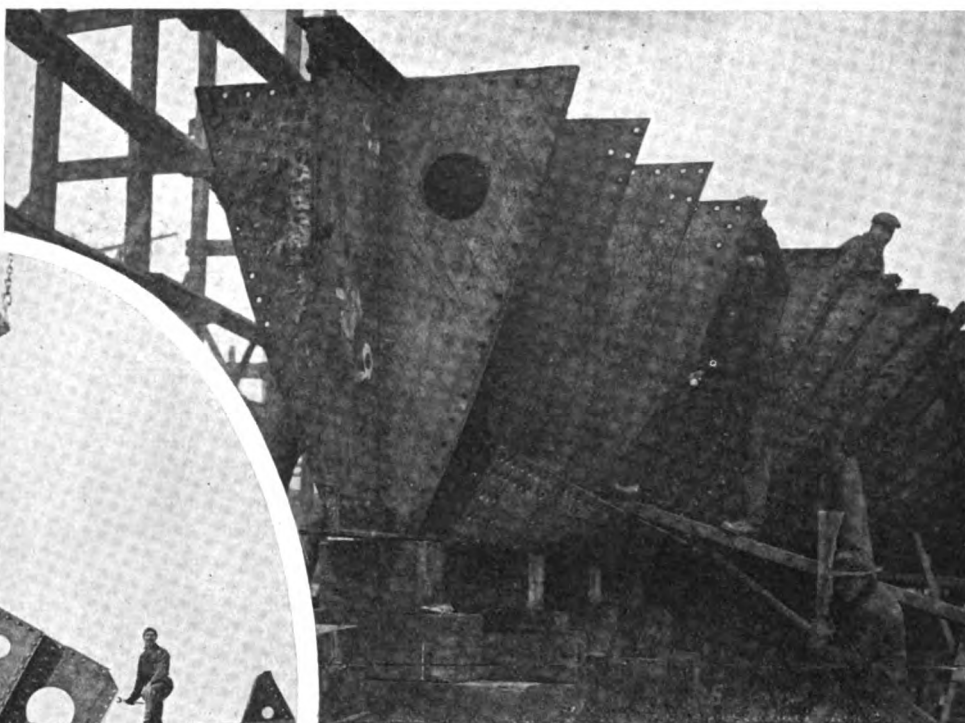
ACTUAL shipbuilding operations have been commenced by the American International Corp. at its new Hog Island plant, near Philadelphia—Fifty vessels of 7500 tons and 70 ships of 8000 tons will be built, according to the provisions of the contract signed Sept. 13, 1917—The contract prices are \$1,100,000 for cargo vessels and \$1,650,000 for troop ships—Deliveries are hoped for at the rate of approximately three ships per month—Provision for the building of 50 ways has been made—Insert shows workmen reaming tank top plates.



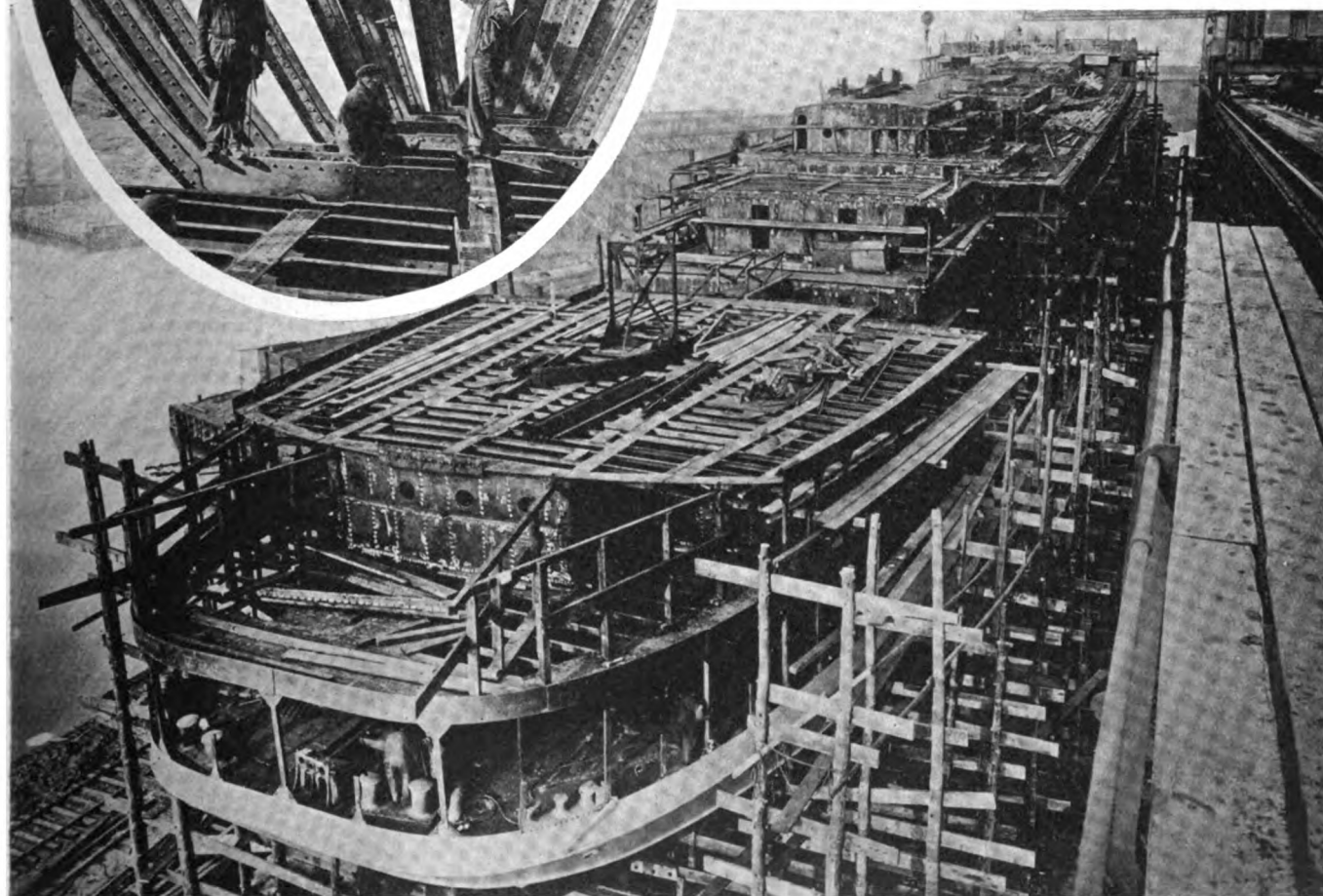
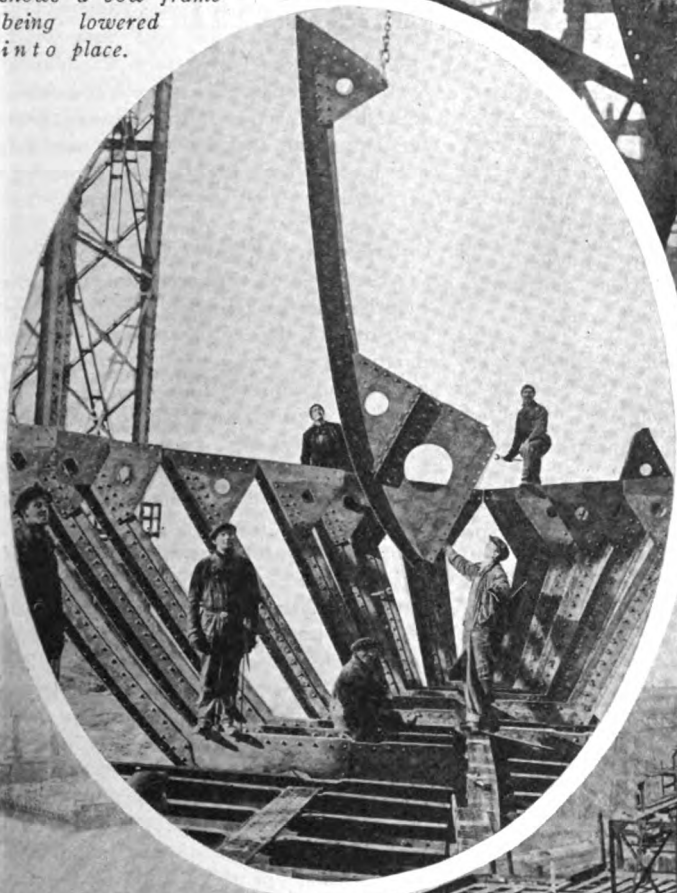
Material is Being Assembled Preparatory to Fitting Out the Ship in the Illustration at the Left—One of the Hundreds of Templates Required in Marking Plates for These Sea Carriers is Reproduced at the Right.

Commences at Huge Eastern Plants

ENORMOUS quantities of materials will be required in the government's shipbuilding activities—The American International Corp. alone will need 500,000 tons of steel and 75,000,000 feet of lumber besides numberless fittings—The insert shows a bow frame being lowered into place.



View in the Way of the Bow Showing Keel Details of One of the Ships Soon to Enter the Service of the Nation.



Method of Framing a Vessel Together With Many Superstructure Details are Illustrated in This View of a Ship Nearly Ready for Launching—Evidence of the Vast Amount of Detail Entering Into Ship Construction is Abundant.

By permission of Committee on Public Information

What the Government is Doing

Rulings on Marine Matters

Improvements to Waterways

Hints to Navigators

Congress Passes Housing Bill

BILLS designed to assist the shipbuilding activities were passed Feb. 12 by congress. The first authorized an appropriation of \$50,000,000 for housing workmen, and the second delegated to President Wilson power to create military zones around private shipbuilding plants engaged on government work. These measures were drafted by the Emergency Fleet corporation and reported to the senate through the senate commerce committee. Debate on them was brief, as their consideration was made possible only by unanimous consent.

Housing Bill Amended

The third bill which would authorize the taking over by the government of electric and other railroads transporting workmen to the shipyards, which was drafted by the Fleet corporation and reported by the committee, was not brought up. Senator Fletcher, who had the legislation in charge, asked that the measure be considered, but Senator Calder, New York, objected, and the bill was sent back to its place on the calendar.

The senate made sundry amendments to the housing bill before it was adopted. As passed it afforded a precedent which will doubtless be followed out in connection with other industrial undertakings in which the war is concerned. As passed it reads:

"That the United States Shipping Board Emergency Fleet Corp. is hereby authorized and empowered within the limit of the amounts herein authorized:

1.—To purchase, lease, requisition or acquire by condemnation or otherwise any improved or unimproved land suitable for the construction thereon of houses for the use of employes of shipyards in which there are now being constructed ships for the United States.

2.—To construct on such land houses and all other necessary or convenient facilities, upon such conditions and at such price as may be determined, and to sell, lease or exchange such houses, land and facilities upon such terms and conditions as it may determine.

3.—To purchase, lease, requisition or acquire by condemnation or otherwise any houses or other buildings, together with the land on which the same are erected, and all necessary and proper fixtures and furnishings therefor; to manage, repair, sell, lease or exchange such lands, houses, buildings, fixtures and furnishings upon such terms and conditions as it may determine.

"Whenever said United States Shipping Board Emergency Fleet Corp. shall purchase, lease, requisition or acquire by condemnation or otherwise such land or such houses, it shall make just compensation therefor, to be determined by it, and if the amount thereof so determined by it is unsatisfactory to the person entitled to receive the same, such person shall be paid 75 per cent of the amount so determined by it, and shall be entitled to sue the United States to recover such further sum as added to such 75 per cent will make up such amount as will be just compensation. therefor in the manner provided for by section 24, paragraph 20 and section 145 of the judicial code.

To End When War Ends

"The power of purchasing, leasing, requisitioning, condemning or otherwise acquiring such land and houses herein granted shall cease with the termination of the present war with Germany.

"The word person used herein shall include any person, trustee, firm or contractor. The word shipyard shall include any factory, workshop, warehouse, engine works, buildings used for manufacturing, assembling, construction or other process in shipyard and dockyards and discharging terminal, and other facilities connected therewith, now or hereafter in connection with shipbuilding.

"The cost of purchasing, leasing, requisitioning, condemning or otherwise acquiring houses, lands, facilities, fixtures and furnishing shall not exceed the sum of \$50,000,000, the expenditure of which is hereby authorized, and in executing the authority granted by this act for such purpose, the said United States Shipping Board Emergency Fleet Corp. shall not expend or obligate the United States to expend more than the said sum.

Sec. 2.—That all acts inconsistent with the exercise of the powers herein granted to the extent that said acts are inconsistent are hereby repealed."

Many American Boats

According to the preliminary report just issued by Director Sam L. Rogers, of the bureau of the census, department of commerce, and compiled under the supervision of Eugene F. Hartley, chief statistician in charge of the recent water transportation inquiry, made as of Dec. 31, 1916, American-owned merchant vessels of five tons net register or over, of all classes, operating during the year 1916 on the coast or inland waters of the United States, including Alaska, or between ports of the United States and foreign countries, numbered 37,894, and had a total gross tonnage of 12,250,000. The gross tonnage was calculated by dividing entire internal capacity, in cubic feet, by 100.

The geographical distribution of this gross tonnage was as follows: Atlantic coast and Gulf of Mexico, 6,509,000; Mississippi river and its tributaries, 1,621,000; Pacific coast, including Alaska, 1,186,000; Great Lakes and St. Lawrence river, 2,738,000; canals and other inland waters, 196,000. The distribution according to method of propulsion was: Steam and other power, 6,098,000; sail, 1,089,000; unrigged, 5,063,000.

The increase in number of vessels as compared with 1906 was equal to only 1½ per cent, and the gross tonnage shows a decrease amounting to 5 per cent. This is accounted for by the marked falling off in number and tonnage of sailing vessels and in tonnage of unrigged craft. The former show a decrease in number from 7131 to 2979, or 58 per cent, and in gross tonnage from 1,704,000 to 1,089,000, or 36 per cent. Unrigged craft, although increasing slightly in number from 20,263 to 20,334, or 0.4 per cent, show a decrease in tonnage from 7,130,000 to 5,063,000, or 29 per cent. On the other hand, craft propelled by steam

and other power increased in number from 9927 to 14,581, or 47 per cent, and in tonnage from 4,060,000 to 6,098,000, or 50 per cent.

The average tonnage per vessel, for the country as a whole, decreased from 345 in 1906 to 323 in 1916.

The proportional increase during the 10-year period in number of vessels was most pronounced on the Pacific coast, including Alaska, where it amounted to 61 per cent; but the greatest rate of increase in tonnage, 34 per cent, appears for the Atlantic coast and the Gulf of Mexico, as against 21 per cent for the Pacific coast, including Alaska. For the Great Lakes and St. Lawrence river the increase in tonnage was 14 per cent. On the other hand, a great decrease in tonnage, from 4,412,000 to 1,621,000, or 63 per cent, took place on the Mississippi river and its tributaries; and a decrease of 24 per cent appears for canals and other inland waters.

Increases in Value and Business Done

Despite the very small increase in number of vessels and the falling off in total gross tonnage throughout the country as a whole during the 10-year period, the figures for value of vessels, gross income, wages paid and freight carried show marked increases, amounting to 89 per cent, 91 per cent, 44 per cent, and 42 per cent, respectively. The number of employees, however, increased by less than 9 per cent, and the number of passengers carried shows a decrease of not quite 10 per cent. The foregoing items for the year 1916 are, in round numbers, as follows: Value of vessels, \$960,000,000; gross income, \$564,000,000; wages paid, \$103,000,000; freight carried, including lighterage or harbor work, 376,000,000 tons of 2000 pounds; number of employees, 153,000; number of passengers carried, 331,600,000.

The pronounced increase between 1906 and 1916 in freight carried, accompanied as it was by a falling off in gross tonnage, is accounted for by the fact, already pointed out, that the decline in tonnage took place entirely in sail and unrigged craft and was offset in considerable part by a decided increase in tonnage of steam and other mechanically propelled vessels. The decrease in the number of passengers carried is due to the reduction in ferry traffic resulting from the establishment of the tube service in Greater New York.

The figures above given relate to vessels which were in active operation during all or a part of the year 1916. In addition, the report for 1916 shows 2681 vessels, with a gross tonnage of 363,000, or less than 3 per

cent of the total tonnage, as idle during the entire year. The increases in number and tonnage of idle vessels during the 10-year period amounted to 52 per cent and 103 per cent, respectively. These increases appear for both power and unrigged craft, but a decrease from 565 to 307 is shown for idle sailing vessels, although the tonnage of such vessels increased from 20,000 to 30,600. The proportion which idle tonnage represented of the total shows an increase from 1906 to 1916 for each of the three classes of craft.

Advisory Committee

An advisory committee of licensed officers in the merchant marine, to work in conjunction with the United States shipping board recruiting service in securing officers and crews for the new

Navy Takes Vessels

Since the United States entered the war the navy has taken over and converted to war use between 700 and 800 passenger and freight vessels, yachts, tugs, fishing boats and other craft. This was disclosed recently in a statement by Chairman Oliver of the house investigating committee, commending the bureaus of construction and repair and steam engineering for the preparations made to meet war demands.

Prompt action of the bureau in getting supplies, the statement said, had enabled the American destroyer force in the war zone to keep in continuous operation and in a high state of efficiency despite the difficult and onerous service in which they are engaged.

ships to be added to the country's cargo fleets, was formed recently at a conference between representatives of the various officers' associations and officials of the shipping board recruiting service at the Boston chamber of commerce.

The committee, of which Henry Howard, director of recruiting for the shipping board, will be chairman, will include a representative of each of the licensed officers' associations on the Atlantic and Pacific coasts and the Great Lakes. It will meet the Tuesday before the first Wednesday in each month at Boston to discuss problems having to do with the manning of Uncle Sam's new merchant fleet.

It is expected that the close co-operation thus secured between representatives of the officers' associations and the government will have a beneficial effect in the securing of representative American complements for the new ships.

Discussions at the conference showed a concert of opinion on the problems to be handled, which include regulation of the supply of licensed officers to meet varying demands of the constantly growing service, exemption of trained men in the merchant marine from military duty and the building up of an all-American merchant marine.

The officers' associations were represented at the conference by Capt. Arthur N. McGray, secretary of the Neptune association of New York, who also represented, by request, the Masters, Mates and Pilots association of the Pacific coast; Capt. Luther B. Dow, of New York, business manager of the American Steamship Licensed Officers' association; William S. Brown, of Buffalo, national president of the Marine Engineers' Beneficial association; James J. Raftery, of Boston, president and George H. Willey, business manager, of the local branch of that association; Capt. Irving Sparks, Boston agent of the Neptune association; Capt. Robert M. Lavender, of Boston, national trustee, American Association of Masters and Pilots; Capt. Ulater Davis, of Albany, holding a similar position; Bert L. Todd, secretary, and Thomas A. King, of New York, chairman of the directors of the Ocean Association of Marine Engineers, New York.

The shipping board recruiting service was represented by Director Howard, Edward Clarence Hovey Jr. and Henry G. Vaughan, of the sea service bureau; Edward F. Flynn, assistant to director; Winfield M. Thompson, field agent, and Capt. Eugene E. O'Donnell, supervising inspector Fifth District United States steamboat inspection service.

Waterway Improvements

Cities on rivers and harbors which do not take advantage of the opportunities offered by government improvements of those waterways, may lose future appropriations. Congressman John H. Small, chairman of the house committee on rivers and harbors suggested this plan to Secretary of War Baker and the latter has indicated his approval.

Congressman Small points out that the improvements financed by the government merely provide a suitable harbor entrance or river channel. To secure water transportation, he outlines the following requirements:

1. There must exist a demand for the movement of products.
2. There must be water terminals constructed in accordance with appropriate plans. These terminals require ample water front and capacious warehouses. They should be physically connected by a belt-line railroad with the railroad or railroads serving the community, and one or more good highways should radiate therefrom. They should

be equipped with modern appliances for transferring freight between the water carrier and the warehouse and the rail car in the cheapest and most expeditious manner. These terminals should be constructed by the municipalities or other agencies of the state and maintained and regulated for the service of the public. The size and cost of such terminals will vary according to the population and the financial ability of the community to be served and the volume of traffic which exists.

3. There must be one or more established lines of water transportation with sufficient capital, the requisite number of carriers, and a complete traffic organization.

4. There should be a complete co-ordination between the water transportation lines and the railroads, and a prorating of traffic as to through rates between the water carriers and the rail carriers such as now exists between the several lines of railroads, to the end that each may complement the other and be jointly dedicated to the service of the public.

"The committee submit that the above additional facilities are both necessary and feasible. They further suggest as a general proposition that water terminals must be provided by the states or by municipalities or other public agencies of the states, and that water carriers must be organized and maintained by individuals, corporations, or other local agencies. It may be substantially stated that congress may only improve for purposes of navigation the capacity of the harbors and the channels of the interior waterways.

"The committee are impressed with the conviction that it is their duty to direct attention to this serious dereliction of duty upon the part of the public and to express the opinion that appropriations should not be made for the improvement of those rivers and harbors where the communities and localities are continuously unwilling to discharge their correlative duty by providing the facilities essential for the promotion of water transportation.

"The committee have not established any arbitrary or inflexible rule. They are conscious that the public must be induced to realize its obligations in the development of water transportation by the processes of publicity and education. They find it difficult to excuse larger cities, where production is large and additional facilities of transportation are so insistent and where neither ignorance nor poverty can be pleaded in extenuation. The committee are further aware that time will be required, even where the civic conscience has been aroused, to provide these facilities and to fully utilize navigable waterways. For the present the committee only insists there shall be no willful disregard of local and public obligations in these respects."

Ferris Resigns

Theodore E. Ferris, naval architect and construction engineer of the Emergency Fleet corporation, who designed most of the steel vessels now building for the government, has resigned.

His resignation, announced by Charles Piez, general manager of the Fleet corporation, is the climax of a bitter controversy growing out of the award of ship contracts to "paper" shipbuilding firms. Ferris was recently under fire before a senate investigating committee as to his previous connection with the Clinchfield Navigation Co., New York.

Mr. Piez stated emphatically that Ferris' resignation had not been due to any irregularities.

"Before coming to the shipping board, Ferris was connected with the Clinchfield Co. on a fee basis," said Piez. "We are not convinced that he acted with any impropriety in introducing Clinchfield to Maj. Gen. George W. Goethals, who approved the contracts. Ferris, after a conference with Chairman E. N. Hurley, thought it best to step out entirely rather than have the slightest suspicion rest upon him in this matter."

U. S. Charters Dutch Ships

Steamships owned in Holland and having an aggregate tonnage of 500,000 have been taken over by the United States.

They have been chartered by the United States shipping board for coastwise and Belgian relief service, releasing American vessels for overseas trade.

Chairman Hurley of the shipping board announced that the negotiations between the war trade board and the Dutch government had been completed and the Dutch tonnage, long idle in New York harbor, has been put under American charter.

The protracted negotiations with Holland were on a basis of barter for food for the Dutch. Part of the ships acquired will be used for carrying the food to Holland and the remainder for American and allied needs.

Some of these ships, now at New York, will be put at once in trade with South America and the West Indies.

Teach Navigation

Two free classes in navigation for the training of qualified seamen for officers in the new American merchant marine are being conducted in New York by the United States shipping board recruiting service. There were 75 students to begin with in each class. The first class was opened Saturday, Dec. 1, at the Seamen's Church institute, 25 South street, under the direction of

Capt. Robert Huntington. The second class opened December 15, under the direction of Capt. Fritz E. Uttmark, at 8 State street.

American citizens 19 to 55 years old, having good vision and hearing and a working knowledge of arithmetic, were accepted for either class on evidence of two years' experience at sea.

The school term for each class is from four to six weeks, according to the student, who on graduation will go before the local inspectors of steam vessels for his examination for a license.

Improve Lighthouses

During the fiscal year ending June 30, 1917, the United States lighthouse service made many improvements. Flashing or occulting lights were installed in place of fixed lights at 39 stations, incandescent oil-vapor lights were substituted for oil-wick lamps at 17 stations, acetylene or oil-gas lights were substituted for oil lights at 26 stations, including four light vessels, and a new lighthouse was established at Cape St. Elias, Kayak, Alaska. These improvements and the use of modern apparatus in increasing the brilliancy of lights have been of value to the safety of commerce.

War Risk Insurance

The treasury department has announced that the personnel of the lighthouse service transferred to the service and jurisdiction of the war and navy departments by Executive order are within the terms of the war risk insurance act of Oct. 6, 1917.

This decision was rendered by the bureau of war-risk insurance, after submitting the matter for the views of the judge advocate general of the war department, and will apply to over 1100 officers and employes of the lighthouse service who have been transferred to the service of the war and navy departments by the President's order.

Will Test Compasses

The bureau of standards at Washington has begun an extensive investigation of magnetic compasses at the request of the compass division of the naval observatory, the joint army and navy board on specifications and the shipping board. It is expected several thousand compasses will be inspected in the course of the next year with a view to developing a standard method of testing them and to preparing specifications for compasses for government use.

Lake Carriers Discuss 1918 Plans

Members of Association at Annual Convention Consider Methods of Handling Huge Tonnage This Season—Will Train Navy Recruits on Lake Boats

PLANS for bringing the powerful transportation forces of the Great Lakes into most effective action during the 1918 season were discussed at the recent annual convention at Detroit of the Lake Carriers' association. Despite their 1917 success in carrying a tonnage of bulk freight close to the maximum ever transported, these owners of lake vessels are considering methods of improving the operations of their ships in order to insure an equally satisfactory record this year.

The convention was held on Thursday, Jan. 17, and was well attended. William Livingstone, president of the association, presided over both of the two sessions which were held. He was assisted by J. S. Ashley, vice president; Harvey D. Goulder, general counsel, and George A. Marr, secretary. There were 17,388 shares represented out of a total of 20,339.

Harry Coulby, chairman of the mobilization committee which will have general supervision over the operation of lake vessels during the coming season, summarized briefly the plans of the committee. He stated that the committee had decided to wait until March before drawing up a definite plan of action. This decision was reached owing to the advisability of waiting until shortly before the opening of the season when a clearer insight could be obtained into the effect which outside factors, such as water levels and railroad congestion, would exert.

Mr. Coulby also outlined the opinion of the committee that it was unwise for the vessel operators to expect to move more tonnage than was carried in 1917. For that reason he suggested that the owners confine their obligations for 1918 to their actual 1917 performance.

This committee in March is expected to outline the general plan under which lake trade will be centrally controlled this year. The plan is expected to be an extension of the methods pursued during the latter part of the 1917 season when the inability of the land carriers to handle freight as rapidly as the vessels, was occasioning serious delay. The success met at that time in cutting down the time lost by vessels in ports led to the decision to place the fleet's entire operations under a central committee.

Unanimous approval was given to

a plan suggested by the government by which men will be trained on the lakes this season in order to fit them for salt water service. Students who are training for service in the new American merchant marine will receive the finishing touches in practical navigation by being placed on board lake vessels for short periods. These boats thus will be serving as training ships for men seeking to qualify as lookouts and wheelmen and at the same time will be carrying out their natural function of transporting a large part

States shipping board after an investigation of the welfare plan. The shipping board wrote:

"The evidence submitted by our investigators confirms our own opinion that there are numerous features of your welfare plan which are highly to be commended and which should by all means be continued and encouraged. Your schools for training able seamen offer much needed opportunity for the intelligent training of seamen for the vessels of the Great Lakes.

"We feel that through this agency you have performed a real service for the American merchant marine. Under existing conditions it would seem especially desirable that this work be continued, and if possible, extended. The success and extent of your plan for encouraging savings among employes of your shops indicates its substantial value to the men. We hope this feature of the welfare plan will be retained. The efforts of your association to mitigate the losses incurred by the men through death, accident and shipwreck are to be commended."

A resolution was approved authorizing the welfare plan committee to "carry forward all of the various features of its work as conducted with marked success in the past, providing for such slight modification in respect to the continuous discharge record as is necessary to meet the change desired by the shipping board."

Reports also were received from the association's industrial committee and from the committee on aids to navigation. The latter committee suggested a number of changes desirable in insuring greater safety in navigation. The reports were referred to the association's executive committee. It was decided to pay members of the aids to navigation committee while they were in attendance at committee meetings.

John T. Kelly, Cleveland, submitted a resolution endorsing legislation now before congress providing for an increase in the salaries of men in the steamboat-inspection service. President Livingstone paid a high tribute to the ability and efficiency of the steamboat inspectors serving on the Great Lakes. The resolution was unanimously approved.

President Livingstone, in his annual report, pointed out that "singularly, yet fortunately, it has de-

Board of Directors

J. S. Ashley.....	Cleveland
H. Coulby	Cleveland
John Mitchell	Cleveland
H. D. Goulder.....	Cleveland
W. C. Richardson.....	Cleveland
W. D. Becker.....	Cleveland
Walton H. McGean.....	Cleveland
A. F. Harvey.....	Cleveland
H. K. Oakes.....	Cleveland
Geo. M. Steinbrenner.....	Cleveland
J. Burton Ayers.....	Cleveland
W. G. Stewart.....	Cleveland
John T. Kelly.....	Cleveland
A. E. R. Schneider.....	Cleveland
C. C. Canfield.....	Cleveland
Chas. O. Jenkins.....	Cleveland
W. M. Williams.....	Cleveland
R. D. Mitchell.....	Cleveland
A. T. Kinney.....	Cleveland
A. W. Thomson.....	Cleveland
W. P. Schaefele.....	Cleveland
C. L. Hutchinson.....	Cleveland
E. C. Collins.....	Cleveland
G. B. Houseman.....	Cleveland
Fred Kennedy.....	Cleveland
D. Sullivan	Chicago
A. C. Sullivan.....	Chicago
H. E. Hughes.....	Chicago
W. Livingstone	Detroit
J. J. Boland.....	Buffalo
J. B. Rodgers.....	Buffalo
G. A. Tomlinson.....	Duluth
D. W. Stocking.....	Duluth
Howard L. Shaw.....	Bay City
H. S. Wilkinson.....	Syracuse
C. D. Dyer.....	Pittsburgh
W. P. Snyder Jr.....	Pittsburgh
W. H. Smith.....	Montreal

of the nation's iron ore, grain and coal supply.

The boats will carry one or more students—as many as can be accommodated—all through the season. The practical experience gained will prove invaluable in fitting the men for the work they will perform when serving in the navy's transport service.

"The government," Mr. Coulby pointed out in sounding his approval of the plan, "is learning what lake vessel owners have always known—that the Great Lakes are the best place in the world for training sailors."

E. C. Collins, Cleveland, chairman of the welfare plan committee of the association, presented a report showing the work carried on during the year. He incorporated in his report the commendation given by the United

volved upon the members of this association to play a large part toward gaining the end for which nine-tenths of the population of the world has pledged itself. The two primary essentials for the successful prosecution of the war, iron ore and grain, were in the northwest, hence our course was plainly revealed.

"When war seemed inevitable, your members happened to be in special session, and though the harbors and channels were blocked with



William Livingstone, the venerable president of the Lake Carriers' association, at the left; at the right is Geo. A. Marr, secretary of the association and attorney-in-fact, Great Lakes Protective association.



ice as rarely, if ever, before, and the outcome of the season's navigating possibilities could not be measured, this association unhesitatingly sent a pledge of its unqualified support to the President. With what fidelity these promises were carried out may be left to the official figures that show the season's movement of ore, grain and coal upon the Great Lakes."

Mr. Livingstone summed up the season's developments in a comprehensive report, liberal extracts from which are given on another page.

Vice President Ashley directed the attention of the members to the fact that the "Jason clause" was now a part of all grain bills of lading and was incorporated in most coal bills of lading. He urged its wider use in ore bills of lading. Mr. Goulder explained the "Jason clause", by which ship and cargo owners are equally liable for the cost of saving

the ship and cargo when imperiled. When an emergency arises, the captain is empowered to act at once without consulting the cargo owners.

Capt. Denis Sullivan, D. Sullivan & Co., Chicago, was not in attendance at the meeting, the first time in 32 years that he had been absent. The association, at the suggestion of President Livingstone, sent him a telegram of regret over his absence and of best wishes for his recovery.

A letter from Maj. Gen. William M. Black, chief of engineers, was read. General Black commended the Lake Carriers' association for its 1917 record, and particularly the work done in opening channels through the ice. Mr. Coulby in commenting on the ice work necessary in the late fall, stated that it must at first be understood that the government would bear the entire expense. The government's interest arose from the desire to move as much grain as possible. Owing to delays in getting grains to the boats, some of the late vessels carried iron ore. Mr. Coulby said the government now desired to bear only that por-

portion of the expense which the grain carriers bore to the ore boats.

In the same way on ice work in Canadian harbors and channels, Mr. Coulby said that the dominion government now expected vessel owners to pay the bills. He pointed out that the fall grain rate had been predicated on the vessel owners being relieved of any bills for ice work.

Emphasis was placed by President Livingstone on the necessity of widening the Livingstone channel to 450 feet. The present channel is only 300 feet wide, but the rock cut was carried to a width of 450 feet at the time that the rest of the channel was completed to the 300-foot width.

William Livingstone was re-elected president of the association. J. A. Ashley was re-elected vice president; Harvey D. Goulder was re-elected general counsel; George P. McKay was re-elected treasurer, and George A. Marr was re-elected secretary and assistant treasurer. A. R. Rumsey was again chosen chief commissioner.

The members of the executive committee were re-elected. These members are: William Livingstone, chairman; J. S. Ashley, Harry Coulby, John Mitchell, H. S. Wilkinson, D. Sullivan, G. A. Tomlinson and C. L.

Hutchinson. The following alternate members were re-elected: John T. Kelly, C. D. Dyer, E. C. Collins, W. C. Richardson and A. F. Harvey. New alternates elected were: J. J. Boland and A. E. R. Schneider.

Fred Kennedy, Cleveland, and H. E. Hughes, Chicago, were elected directors. The other directors were re-elected.

The appointments to the association's industrial committee are: Capt. D. D. Lyons, Great Lakes Steamship Co.; T. E. Murray, Cleveland-Cliffs Iron Co.; Frank C. Pratt, D. Sullivan & Co.; C. C. Balfour, Franklin Steam-

ship Co.; L. W. Stone, Interlake Steamship Co.; and W. G. Allen, W. D. Becker & Co.; Engineers, John McMonagle, Shenango Steamship & Transportation Co.; Oscar Anderson, W. C. Richardson & Co.; George Pennycook, M. A. Hanna & Co.; Edward F. Samson, Hutchinson & Co.; Henry Moore, Pittsburgh Steamship Co., and William Millington, Boland & Cornelius.

The committee on aids to navigation includes: Capt. S. E. Allen, Pittsburgh Steamship Co., chairman; Capt. C. A. Benham, Hutchinson & Co.; Thomas H. Saunders, Harvey H.

Brown & Co.; Charles J. Auttersen, G. A. Tomlinson & Co.; George B. Brock, M. A. Hanna & Co.; C. B. Galton, Mitchell & Co.; Benson Fox, Shenango Steamship & Transportation Co.; C. F. Hahn, American Steamship Co.; Martin Peterson, Boland & Cornelius; Daniel Bouie Wilson Transit Co.; W. J. Hunt, Pittsburgh Steamship Co., and C. H. Woodford, Interlake Steamship Co.

The annual banquet was held Thursday evening with President Livingstone as toastmaster. A number of the members and invited guests were called upon for short talks.

Lake Records Fall Despite Delays

By William Livingstone

President, Lake Carriers' Association

HOW the 1917 movement was carried to its successful conclusion forms one of the most interesting chapters in the entire history of lake navigation. Obstacles such as vessel owners never before encountered met them at every turn. Unprecedented ice was a deterrent cause in the opening of navigation. Not a ton of ore could be brought to lower lake ports in the month of April from Lake Superior, while in May the ports for loading ore were closed for days at a time and until late in June floating ice was a menace, and an obstacle to expeditious navigation.

Causes of Delay

Throughout the season dispatch was hampered through the lack of unloading facilities at the lower lake terminals and by the congested freight yards; an uncommonly foggy year, and freezing temperatures early in October all had an effect, so that it can safely be said that at no time during the season was it possible for the fleet to operate under completely normal conditions.

Through energetic operation the fleet brought down 62,498,901 gross tons of ore, whereas early estimates and furnace requirements fixed the maximum movement at 55,000,000 tons. Handicapped though the fleet was, the season's movement was within 2,235,297 tons of the splendid high record movement of 1916, made under favorable conditions. The fleet brought down 188,921,956 bushels of wheat and 73,933,645 bushels of other grains, making a movement of 7,161,716 net tons of grain for the season. With equal force the critical coal situation was attacked. As a result of whole-hearted co-operation the coal movement to the Northwest reached

31,192,613 net tons, as against 28,440,483 tons in 1916.

The season was marked by the highest water levels of many years, the stage of Lake Erie at one period exceeding the unusually high water of 1916 by no less than one foot.

The association will begin 1918 with an increase in membership so far as the number of vessels is concerned. No material losses through shipwreck were sustained in the past season, with the exception of the small freighter *GOUDREAU*, and the sales of vessels in memberships to the Atlantic coastwise service were small in comparison with the preceding 12 months. The requirements of the government have so far been largely confined to the package freighters, and have removed only seven vessels of 15,893 gross tonnage from our membership. Our extensive building program, commenced before the war seemed a possibility, reached completion with the launching of the steamer *AUGUST ZIESING* on Oct. 30, and this new construction, together with some recovered property, has added to our membership 12 bulk freighters of 89,301 gross tonnage, of which seven are 600 feet and four 545 feet over all, in length. Until the war will have come to an end there can be no hope for any further increases in our association's tonnage through new construction. Nevertheless, the present membership represents a total of 2,084,922 tons, an amount adequate for successfully handling almost any burden that the nation may impose upon us.

Thoroughly impressed with the responsibilities placed in their hands, vessel owners, made preparations for the opening of navigation with vim and energy that commanded admiration. To meet the growing operating

charges, contract ore rates were, on Nov. 16, 1916, advanced to \$1 a ton free from the head of Lake Superior, the highest paid on ore since 1900. The ore rate from Marquette was fixed at 90 cents, and from Escanaba at 75 cents, both free to the vessel.

Delays at Opening

All available ships were ready early for opening navigation on April 15, and the outlook appeared optimistic inasmuch as Lake Erie, from Detroit river to Conneaut, was clear of ice on March 20, while the Cleveland harbor opened on March 16, an advance of three weeks over the preceding year. On April 1, the river and channels up to Lake Huron were open and the steamers *MARUBA* and *EMORY L. FORD*, that had been caught at Port Huron at the close of navigation in 1916, proceeded down with their cargoes of grain. The *MARUBA* made the port of Erie, Pa., on April 3, but the *FORD*, bound for Buffalo with 360,000 bushels of wheat, was stopped by heavy ice off Westfield. She safely lay in this position from April 5 to 18, when she released herself and after returning to Erie for supplies, proceeded on to her destination. By forcing herself through the ice fields, the *FORD* opened the port of Buffalo to incoming vessels on April 23. The grain-laden steamers *J. J. SULLIVAN*, *PRICE MCKINNEY* and *F. R. HAZARD*, that had also wintered along the river, awaited the outcome of the *FORD*'s voyage before putting out. On April 12 the steamers *WM. P. SNYDER JR.*, *COL. J. M. SCHOONMAKER* and *SHENANGO* made a dash from Buffalo harbor with the hope of getting through as they did one year previously, but they were caught in the ice three miles up the lake and held until April 19.

In the upper lakes and rivers the ice conditions were the worst of a

decade. On March 30 there was 26½ inches of ice at the Sault, and 38 inches in Duluth harbor. There was found at the head of Lake Superior the unusual condition of 28 inches of hard, blue ice and heavy ice extended out from Two Harbors for 12 miles.

Work of Ice Breakers

On April 7 the Canadian government sent out the ice breaker ALGOMAH from St. Ignace, in an endeavor to open up St. Mary's river. By easy headway through the ice fields in Lake Huron the ALGOMAH arrived at Detour in 24 hours, but in the river blue ice from 20 to 30 inches in thickness was encountered and her effort was temporarily abandoned. The ALGOMAH returned to her work on April 13 and after four more days of hard bucking, the Sault was reached on April 17. But seven days elapsed before a bulk freighter reached the locks.

While the ALGOMAH was at work, the whaleback steamers HENRY CORT and J. B. NEILSON, with the MARICOPA and the tug ALABAMA, started from Port Huron on April 20 to cut through Lake Huron. They reached and opened the Straits on April 22 and on the following day 11 freighters passed down with some difficulty. The HARVESTER, in the van, entered the American lock at 2:30 p. m. on April 24, followed by the JOHN J. BARLUM and SCRANTON through the Canadian lock. These vessels did not pass Whitefish point until the morning of April 26, when they became fast in the ice. They made slow progress; by April 30 THE HARVESTER had reached a point five miles outside Duluth, but the BARLUM on that day reached her destination at Fort William, the ice having parted temporarily. In the meantime a large number of vessels had passed up at the Sault, and on April 30 the steamer D. R. HANNA forced a passage into Duluth and was followed by the BUTLER JR. and THE HARVESTER, while the E. N. SAUNDERS JR., light for Ashland, forced her way out of Duluth.

From this point on, and covering a long period, operation of the vessels was marked by hardship and anxiety, and that it was not attended by shipwreck and loss of life speaks loudly of the high point of efficiency that has been reached by lake navigation.

In place of rain, recurring periods of cold weather stiffened the ice wherever it collected. Not a downbound cargo passed through the locks at the Sault in April, but Lake Michigan and the Straits having kept free, it was possible to trade from Escanaba, with the result that 24 cargoes of ore got away in April, but only 10 were delivered in the month, equally divided between

South Chicago and Lake Erie ports. The steamer MARTIN MULLEN reached Cleveland on April 27 with the first ore cargo, and on May 1 the HYDRUS reached Buffalo ore-laden. On May 1 also, three ships with ore, and eight with grain, constituted the first fleet to clear from Duluth, and on the next day Two Harbors, Ashland and Fort William opened to outgoing ships, but the lower end of Lake Superior became firmly wedged with ice, while Buffalo

How Situation Was Met

Our members whenever called upon lent their substantial experience and a portion of almost every working day toward facilitating the general movement of lake commerce. At a meeting of this association, your president was directed to appoint a small committee of vessel men, that might be added to at any time, whose duties would be to see that all ports be kept supplied with boats, as well as to meet the requirements of the shippers of bituminous coal and to co-ordinate with all interests concerned in order to speed up the coal movement. This committee, consisting of W. H. McGean, A. W. Thompson and J. T. Kelly, rendered such a good account of their activities that when the movement of the new grain crop came up for consideration, your president was directed to augment this committee by the addition of several members expert in the grain trade and take charge of and work out the question of grain tonnage as it worked on coal. Six new members, W. M. Williams, R. H. Pigott, J. Burton Ayers, Carl Timmermann, F. J. Sullivan, and G. B. Houseman, therefore, made a whole committee of nine experienced vessel operators, which, until the close of navigation assisted in establishing the rapid movement in coal and grain that was a marked feature of the autumn's commerce.

was completely blocked again, and a fleet of 40 vessels was waiting outside the Welland canal. There were 100 vessels so effectually icebound in Whitefish bay, and at the Sault, that they were unable to move on May 4, but on May 5 a few boats worked their way through the lower end of Lake Superior and THE HARVESTER, which on April 24 had been the first boat to pass up, passed down that afternoon. Conservative estimates placed the loss to the ore movement at 2,500,000 tons up to this time.

As an evidence of how belated the

season stood at this time it is notable that the first round trip from Buffalo to the head of the lakes, as made by the T. H. WICKWIRE, was not completed until May 8, while the first round trip to Duluth, as made by THE HARVESTER, was not completed until May 10. Throughout May this tedious, expensive condition continued. A remarkable example of the obstinacy of the ice was furnished by the situation that prevailed off Marquette. A fleet of vessels that arrived off that port on April 27, was held fast in heavy ice until May 16. At the same time drift ice at the Sault, and heavily packed ice at Whitefish point, seriously delayed all shipping. The ice congestion at the locks was so serious that of 75 vessels waiting to lock through on May 13, only 19 upbound and 18 downbound ships were handled by the three locks in the 24 hours. On May 20 a strong northwest wind brought the ice back to Duluth and the fields extended from Parisian islands for 75 miles into Lake Superior. With the winds, the harbors at both Duluth and Marquette opened and closed, and on May 23 an almost unprecedented snowstorm once more tied up traffic at the Sault. On May 28 and again on June 1 the Marquette harbor was effectually blocked and seven vessels were fast in the ice off that port. On June 5 the steamer E. A. UHRIG was fast in the ice one-half mile outside Duluth, and on the following day a gale packed the ice in so tight that vessels were unable to get into or out of the Duluth harbor; 17 vessels were held fast. So late as June 8 Marquette harbor was blocked and on June 13 no ice was in sight at Duluth for the first time. There continued to be, however, menacing fields of ice in Lake Superior and bergs extending under the water for 70 feet were encountered in Whitefish bay on June 15.

Such were the trying conditions of the early season of 1917, and it needs no expert to tell what had to be endured to make navigation possible; a large number of vessels suffered the loss of propeller blades, and nearly all had damaged plates. In addition unfavorable winds, freezing temperatures at night with snow squalls, all conspired against successful operation.

Fleet Faced Handicap

With two months of the season now gone and the fleet far behind in its schedule on ore, coal and grain, any hope of approaching the successful season of 1916 had practically vanished. With increased energy the fleet went at the task of making up the large losses so far as possible, and how well it succeeded is exemplified by the ore movement in July, which in

spite of the drawbacks of unloading delays, exceeded 10,000,000 gross tons—an achievement never before recorded in ore history. Those figures alone indicate what the total lake traffic for 1917 might have been had the vessels been provided with adequate dispatch.

Of material aid to the ore fleet of 1916 in establishing its record of more than 64,000,000 tons was the impetus given it by the movement of 1,658,411 tons in the last 10 days of April. With only Escanaba available to the 1917 fleet during the corresponding period the trade for last April consisted of the bare 211,532 tons loaded into 25 ships. Thus the fleet began the month of May with a loss of 1,446,879 tons. The decidedly unfavorable sailing conditions of May added another million tons to the season's loss when June 1 came to hand, for the fleet in the 31 days of May handled less than 6,300,000 tons, as against almost 8,450,000 tons in the preceding May. In June there developed an accelerated movement of all the ships the total of 9,639,991 gross tons being the largest 30-day mark on record.

Many Vessels Delayed

In July the fleet brought down 10,241,633 tons of ore, the largest in history, and this was accomplished after the most serious unloading delays in the first 10 days of the month that a modern fleet ever encountered. Vessels lost from one week to 10 days, representing a trip, at least, in many cases. As an example of the pronounced delays, and this was by no means a single instance, one steamer which passed down at the Sault at 10 a. m. on June 30, did not pass up again until 12:30 a. m. on July 13. In the same month, the Duluth, Missabe & Northern railroad shipped 3,543,874 gross tons, the largest amount ever shipped from any dock system in the same space of time. This shipment actually averaged 4763 tons every hour of the month of July. Another 10,000,000-ton month was recorded in August and this decreased the season's losses of ore tonnage to a trifle less than 2,700,000 tons, but constant delays in September brought further losses, and the climax to a season of unfavorable operating conditions was reached when October assumed the proportions of a winter month. Heavy snow and freezing temperatures made a cut of 1,000,000 tons in the monthly shipment when compared with October, 1916. And still the total for the season so far was 54,253,598 gross tons—very close to the early estimates—with six weeks of navigation remaining to be accounted for.

November proved unusually propitious for vessel operation. There were few gales, high temperatures and less delays, with the result that the ore tonnage for the short month reached the astonishing total of 7,333,828 tons. This was an increase of 1,618,376 tons over November one year ago, placed the year's total well above 61,000,000 tons and decreased the season's loss to only 2,000,000 tons.

The grain trade of last spring and summer was spectacular in all its aspects and contributed one of the

Coal Situation Serious

Probably the gravest problem placed before our members last year was a solution of the coal situation. As an inheritance from the season of 1916 that grew more serious from day to day, it finally became a matter that affected the entire country. Primarily the cause arose through the inability of the railroads to handle the tremendous amount of freight literally thrown upon them, and which caused congestion everywhere. Had the vessels been furnished the coal they were capable of handling, with anything that approached promptness, the fleet would early have coped with the acute situation, as was well demonstrated by the speed with which the lake coal was transported after the Lake Erie Bituminous Coal Exchange became thoroughly organized and its machinery began working smoothly in co-operation with the Lake Carriers' committee.

most interesting chapters to the eventual year's business. Although the stocks in the Northwest were considerably reduced in comparison with other years, a demand for tonnage made itself evident early in the new year. The initial charter, made on Feb. 24, was 5½ cents on wheat from Lake Superior to Buffalo. At the end of that month, the carrying rate went to 6 cents, but as the opening of navigation drew near, the price settled back to 5½ cents.

Under the impetus of a flourishing trade it is but natural that carrying charges should advance. May 10 was characterized by a rate of 6¼ cents, which was the record price for opening shipment since the coming of the big steel freighter, and on the same day 5½ cents was paid on flax from Duluth to Milwaukee. But with an ever-increasing demand for tonnage, shippers were unable to sustain even this attractive price for long. Within

one week 6½ cents was paid on wheat from Fort William to Buffalo for immediate loading. On May 22 an offer of 7 cents on flax went unfilled, since not a single spot boat could be found in the market. On May 24 the rate paid on wheat from Fort William to Buffalo rose to 7 cents and at this figure there were too few boats to supply the demand. The 7-cent rate continued for one week with charters made for June loading. The final charter at an extreme price was one of 6½ cents made in June for flax from Fort William to Buffalo.

By the middle of June grain stocks were pretty well depleted and grain men ceased to bid ahead for tonnage. Through steady declines the rate on wheat and flax fell to 3½ cents on June 23 and with a steadily increasing ore movement vessel owners turned to that commodity.

Heavy Grain Shipments

During the flush of grain's activity 149 steel bulk freighters participated in the movement. The late opening of navigation and the interference of ice set the fleet back about three weeks, it was conservatively estimated, and yet up to June 1 the Buffalo elevators unloaded 44,190,336 bushels and the loss stood at only 1,410,416 bushels from the exceptional trade of the year previously. Under more normal operating conditions in June the grain shipments to Buffalo were 1,406,130 bushels in excess of the year preceding, although there had been a material falling off of shipping through the late days of June. In June alone, the elevators unloaded 23,102,793 bushels and this made the season's movement to July 1, 67,293,128 bushels as against 65,886,999 bushels in 1916.

With the bottom now out of the grain market, and cargoes available for only the smaller vessels, there was little activity in grain until the time arrived for figuring upon the new crop. The small amounts of grain shipped were chartered at 3 cents. Still at the end of July the shippers found it necessary to advance the price to 5 cents for lower lake ports and to 4 cents from Duluth to Georgian Bay.

Your members at a special meeting with Julius H. Barnes, director of the grain division of the food administration unanimously adopted a committee's report to carry grain for the remainder of the regular season to midnight, Nov. 30, at 4½ cents per bushel. It was further agreed by the government that the business of handling the tonnage and the loading of grain be pooled. The movement

was directed, therefore, by the Duluth Grain Chartering Corp. at the head of the lakes, and the committee of nine from the Lake Carriers' association covered the lower lake ports. The Winnipeg chartering committee covered all Canadian shipments of grain.

The efficiency of the arrangement made itself evident at once. The shippers of ore lent a hand early in October by withdrawing from the market for wild tonnage in order that all free boats might be diverted to the grain trade.

The history of the fall movement is briefly told; vessel tonnage was made available for all the grain in sight. With the closing of the regular season and, at the same time, the expiration of insurance, Mr. Barnes came to your association again: For a rate on post season cargoes, and on storage, as well as for an extension of the sailing season as far into December as the weather would permit. A rate of $5\frac{1}{4}$ cents for boats taking cargoes from Dec. 1 to Dec. 12, and a storage rate of 6 cents, were both accepted. Furthermore, the American underwriters granted insurance extensions up to midnight Dec. 17 at $1\frac{1}{2}$ per cent, and up to midnight, Dec. 22, at 2 per cent, inclusive, from Nov. 30. And of this the Great Lakes Protective association reserved its usual 25 per cent from the conventional insurance. Thus vessel owners and underwriters alike accepted the government's wishes to meet the national emergency notwithstanding the heavy risks entailed.

The council for national defense

became apprehensive in the early part of May lest the delay in the loading of vessels provoke another coal shortage. To reduce to a minimum the holding of cars and of vessels at the loading ports a plan was reached for pooling all coal shipments to the head of the lakes. Through this co-ordination all shipments of coal to Erie, Conneaut, Ash-tabula, Fairport, Cleveland, Lorain, Huron, Sandusky and Toledo being in the hands of a central executive committee, there was a marked increase in the arrival of coal at the docks and your members provided enough capacity that quickly dispelled the feeling of doubt which the government might have entertained as to an adequate winter's supply in the Northwest. When the coal exchange began to operate on June 1, the shortage in the season's shipments totaled more than 2,500,000 tons, but when the exchange began its effective work the car supply showed an appreciable increase both at the mines and docks, and there was an almost steady stream of steamers carrying coal up the lakes.

Coal Shipments Given Preference

The movement was further increased after Aug. 20 when the government appointed Judge Robert S. Lovett as administrative officer charged with the execution of the priority shipment act. A mandatory order was issued that gave preference to shipments of coal to lake ports over all other commodities. It was the first time in the history of the federal government that the transportation

agencies of the country were served with orders for priority shipments. The importance of this event to your members is reflected in the cargoes the vessels were enabled to procure from that period on. Within the week the vessels began taking coal at the rate of 1,000,000 tons each week, and there was no let-up, so far as the vessels were concerned, until navigation closed. In passing it is noteworthy to recall that in September the fleet made the record of 4,627,107 tons, while by Oct. 1 the season's shortage had been all but wiped out. In November, 3,092,547 tons of coal went up the lakes and this led the coal exchange to issue the gratifying statement that total shipments to Dec. 1 totaled 25,855,737 tons, as against 23,919,062 tons in 1916. Furthermore, the shipments of coal to Duluth-Superior up to Nov. 30 reached 8,748,492 tons of soft coal and 1,764,000 tons of hard coal, making a grand total of 10,512,495 tons, as against 9,186,748 tons in the same period of 1916.

The lake shipments of anthracite coal consisted of 4,100,000 net tons from Buffalo and of 589,993 tons from Erie, Pa., which made the total movement for the season 4,689,993 tons, a gain of 266,193 tons over the shipments of 1916. This increased movement of anthracite, with the increased shipments of bituminous coal, brought the total lake movement of coal up to the high figures of 31,192,613 net tons. The result therefore shows a grand total coal movement in excess of 30,000,000 tons for the second time in history.

Report of Protective Association

THE Great Lakes Protective association held its annual meeting at Detroit, Jan. 18. The report of the officers, which was submitted, showed forcibly that despite the unusually dangerous conditions under which the boats were operated during the year, the results were highly satisfactory. The chairman, J. S. Ashley, pointed out, however, that considerable improvement could have been effected if closer attention had been given to the precautionary rulings of the association.

The meeting served to direct attention again to the work which the association has been doing, and particularly the part it has played in promoting the safety of operations and in lowering the cost of insurance. These developments have been of material advantage to everyone connected with the lake trade. Sailors and owners have benefited from the

greater safety of operations, the owners from a decreased cost of insurance, and the regular underwriters from a reduction in their losses as a corollary to the reduction in number of accidents.

Chairman Ashley, after the presentation of the annual report, discussed briefly the work of the association. In taking up the question of what proportion of insurance should be carried by the vessel owners in 1918, Mr. Ashley asked that the advisory committee be given authority to increase the 25 per cent which the association has taken, provided such change was found advisable.

"The underwriters," Mr. Ashley pointed out, "intend to make various changes. Some desire an increase in rate while others favor an increase in valuation. Two of the largest firms have lately signified their willingness to reaffirm the 1917 rate, terms

and conditions with an increase allowed in the hull value of \$5 a ton, or from \$51 to \$56."

He stated that the increased hull valuation would amount to \$500 to \$600 on the big ships. He suggested that if the other underwriters took the same position as the two under discussion, that he would not be in favor of increasing the proportion of insurance carried by the association as the general increases in costs seemed to warrant the slight increase suggested by the underwriters.

The power asked for by the advisory committee to determine definitely the proportion to be carried by the association, was unanimously granted.

The chairman pointed out that the year's operations had shown a small profit for the association and a small loss for the underwriters—the latter resulting from the sinking of the SAXONA.

Mr. Ashley also referred to changes which he felt should be made in the post season clauses.

Harry Coulby, president of the Pittsburgh Steamship Co., spoke extemporaneously on the value of bonuses in stimulating safety of operations. He urged their wider and continued use as an effective method of holding avoidable accidents to a minimum.

The 1917 operations, as indicated, showed a small profit which was held down by the losses incurred by the vessels during the protracted periods of ice blockades and foggy weather. The association has carried 25 per cent of the risk during five of the eight years of its existence.

All of the members of the advisory committee were re-elected. These members are: J. S. Ashle, Capt. W. C. Richardson, Capt. Charles L. Hutchinson, Harry Coulby, C. D. Dyer, H. K. Oakes, John J. Boland, A. E. R. Schneider, William Livingstone, Capt. D. Sullivan and W. H. Becker. These members later elect officers. The present officials will probably be re-elected. They are J. S. Ashley, chairman; Capt. W. C. Richardson, treasurer; Harvey D. Goulder, counsel; George A. Marr, secretary and attorney in fact.

Portions of the report follow:

After carefully compiling its usual record of accidents for the year, your committee is by no means satisfied with the result in operation. On the other hand, while the number of partial losses exceeds the record of other years, there are a great many conditions which have been so abnormal that an increase in the number of accidents must naturally result. At the start of the season we were confronted with ice conditions over all the lakes which were unprecedented. It was not until the middle of June that vessels were able to sail without the danger of sustaining damage from this source. Extremely cold weather set in again about Dec. 1, so that before the first week of that month had passed ice formed to the thickness of 14 inches in upper harbors and rivers, making it necessary to employ ice crushers before it was possible to move the vessels at all. It will be realized, therefore, that there were only five and one-half months of fair sailing weather during the entire season. Consideration must also be given to the low temperature of the water well up into the summertime and also at the close of the season, which produced fogs and thick weather, making navigation extremely difficult and dangerous. In the face of these adverse conditions the demand for the movement of ore, coal and grain, as well as other merchandise, is well known, and while under normal conditions the vessel owners would de-

cline to attempt navigation with their ships, duty thrust upon them by the exigencies of the general situation demanded that every available craft be placed in operation regardless of these hazards. The general aspect of the situation at the time of normal opening of navigation, April 15, was such that vessel owners did not believe any ships could move before the middle of May at the earliest. However, we find that practically all were in operation before April 27, the majority clearing between April 23 and that date. To complete the first trips required from three weeks to a month, while under ordinary conditions a round trip should be made in from eight to 10 days. This condition also existed in the trips made under post season sailings during the month of December, some vessels requiring so

with every effort to produce the maximum efficiency in the operation of the ships.

Under ordinary conditions better results would have been obtained, and it is hoped that the next season's operation will again show a gratifying result. To attain this both our navigators and subscribers must continue with redoubled effort in the application of the pilot rules and the rules of this association and use every caution to avoid disaster wherever it is liable to occur. A great responsibility devolves upon every owner and officer to safeguard his ship, as every ounce of tonnage is needed for the movement of supplies which the nation requires and which the nation demands. To meet this successfully we must use every effort to avoid accidents.

Financial Statement for 1917

Navigating contributions to Dec. 1, 1917.....	\$354,467.02
Early port risks.....	1,905.70
Extensions into port.....	2,819.16
Post season trips.....	57,298.50
Interest on deferred payments of contribution.....	51.65
Interest from depositories.....	3,358.51
Funds to pay losses and expenses.....	\$419,900.54
Expenses of the association to Nov. 30, 1917, estimated on pro rata of the year's expenses (actual expenses \$25,066.34).....	\$28,741.00
Internal revenue to pay.....	596.55
Claims paid to date.....	\$29,337.55
Claims adjusted but not paid.....	\$39,014.47
Claims expected (estimated).....	47,232.84
	298,200.00
	\$384,447.31
	\$413,784.86
Or, indicating a surplus of.....	\$6,115.68
Cleveland, O., Jan. 4, 1918.	

long as three weeks to reach their destination. The obstacles with which our navigators have had to contend this year were, therefore, extremely abnormal and unprecedented, and in considering the unsatisfactory result financially we must accept whatever consolation the situation affords in the knowledge that it is gratifying the result has not been more serious.

Heavy Losses Sustained

The total of the losses on our vessels this year will probably reach one and one-half millions of dollars, which, we must concede, is a very poor showing. However, the situation demands that we consider the extraordinary difficult conditions that prevailed and which were bound of themselves to produce an undesirable result over which there was no control—particularly referring to the ice conditions, already mentioned, and the extraordinary effort made by the members of the association to meet the country's demand for the movement of freight contingent upon the urgent requirements of the nation and the alacrity with which these requirements were met, both by the owners and by the navigators, in responding

Vessels of ours to the number of 120 participated in special post season trips after the normal closing of navigation Nov. 30, midnight; two vessels stranded, but were released with, fortunately, small damage in either case. One serious collision resulted in the sinking of the HENRY CORT, used as an ice crusher, in the vicinity of Southeast shoal, and a small number of the ships sustained corrugations to their bows in working through the ice, but in no case so far reported will damage amount to the three per cent deductible average, so that we do not anticipate any claims from this source. Two vessels in the membership cleared with government grain from the head of the lakes on Dec. 14 and neither of these vessels reported any damage, therefore the resulting operation under these post season trips has been quite satisfactory and will show a profit to the underwriters, notwithstanding the very adverse weather conditions.

In a general review of accidents, there were 22 total losses of all craft reported on the lakes during the year, including one vessel in the membership of the association. Therefore the result in this regard is quite gratifying.

There were 52 vessels damaged in the early part of the season by contact with ice, entailing a loss of approximately \$170,000.

Divers Remove Rocks

On account of good drafts of water in all rivers and channels, the groundings and striking obstructions have been quite normal, with the exception of at Vidal shoal, where there was found to be quite a number of obstructions in the nature of rocks carried down by the ice floes during the spring of the year. When this condition was discovered immediate steps were taken by the Lake Carriers' association to remove them by engaging an outfit with divers, who picked up a great number of boulders and swept the channel clear to normal depth.

The losses resulting from striking of piers, docks and other fixed objects have been quite out of proportion during the year, indicating carelessness in navigation inside of harbors. The association has continuously called attention of navigators to this source of loss, warning them time and again that it is best to take their time and avoid these annoying incidents. We have had 40 such cases during the year, aggregating total loss of \$110,000, of which the owners must assume \$20,000 in deductible averages. It is needless to say that this source of loss is entirely avoidable, and any navigator who resorts to speed or any maneuver to get ahead of another vessel in a dangerous position inside of a harbor cannot be too severely criticised. Among these losses are a number in which the vessel was being towed by tugs, and the masters' reports generally criticise the tugs for damage done. Perhaps in some cases the tugs may be flagrantly at fault, but the navigator should take every precaution to see that his vessel is not towed at too great a speed.

In the division of losses into the months in which they occurred is reflected quite generally the abnormal conditions to which we attribute the increase in our accidents during the past season. We submit herewith the following statement:

1915		1916		1917	
No. of acci-	Per cent of whole	No. of acci-	Per cent of whole	No. of acci-	Per cent of whole
Mth. dents	loss	dents	loss	dents	loss
Apr. 7	4.68	12	5.87	7	1.32
May 14	9.03	20	21.43	72	26.22
June 7	4.60	15	6.65	26	9.83
July 10	4.24	14	17.07	13	7.02
Aug. 7	5.95	15	12.06	15	10.56
Sept. 17	23.59	13	7.31	15	6.36
Oct. 20	18.22	23	13.77	28	17.21
Nov. 39	29.51	18	13.47	33	18.44
Dec. 1	Small	3	2.37	7	3.04
122		133		216	

In the annual report for the year 1916 there were 159 vessels then in the membership of the association with gross registered tonnage of 812,808 tons.

From these the steamer LIVINGSTONE was withdrawn at the close of the fiscal year 1916, gross tons, 2134.

To these the following 22 steel steamers were admitted to the membership in the fiscal year 1917:

	Gross tons
J. J. Sullivan.....	7,077
D. R. Hanna.....	7,023
Jos. G. Butler Jr.....	6,588
A. A. Augustus.....	6,390
G. A. Tomlinson.....	6,361
F. R. Hazard.....	5,494
E. L. Pierce.....	5,494
Frank Billings.....	5,494
Price McKinney.....	5,250
John Stanton.....	6,129
Wm. A. Paine.....	5,798
James P. Walsh.....	5,326
Martin Mullen.....	4,635
Harold B. Nye.....	4,256
Australia.....	3,845
Amazon.....	3,702
Polynesia.....	3,646
J. T. Hutchinson.....	3,690
Maruba.....	2,311
Yuma.....	2,194
Yosemite.....	3,879
Christopher.....	4,260

Total tonnage 108,836

Also there have been added six newly constructed steel steamers, as follows:

	Gross tons
Midvale.....	8,271
Louis W. Hill.....	7,038
Carmi A. Thompson.....	7,038
Wm. A. Amberg.....	7,031
Frank H. Goodyear.....	8,243
Pontiac.....	8,200

Total tonnage 45,821

Leaving 186 vessels active in the membership of the association for the fiscal year of 1917, divided as shown in the following table which gives the type

of vessel, the gross tonnage of each and the total tonnage.

	Gross tons
175 steel steamers.....	939,325
5 Steel barges.....	13,291
3 composite steamers.....	6,067
2 wooden barges.....	4,811
1 wooden steamer.....	1,837
186 Total.....	965,331

On the 186 vessels active in the membership of the association during the fiscal year of 1917, we have written 187 certificates, valuation aggregating \$48,724,263. Of this the association assumed 25 per cent or \$12,181,066.

The above tonnage statement includes all vessels comprising the membership for the fiscal year 1917, and which tonnage is entitled to representation in matters concerning the association's business for that fiscal year. During the calendar year 1917 there has been one total loss, the GOUDREAU, a vessel of 2298 gross tons.

This makes a total of 185 with total gross registered tonnage of 963,033 tons actively in the membership Jan. 1, 1918.

On account of the greater majority of our losses in the present fiscal year being unadjusted, it is quite impossible to state with any degree of accuracy the result of the year's operation; only 38 losses have been adjusted and there remain, according to present computation, 178 to adjust. We have, however, examined these and made estimates which we believe will more than satisfy the losses.

Accident Statement for Years 1909-1917

COMPARATIVE STATEMENT OF ACCIDENTS REPORTED DURING SAILING SEASONS

	1909	1910	1911	1912	1913	1914	1915	1916	1917
Strandings.....	54	9	14	31	20	18	30	18	23
Groundings.....	128	60	42	30	19	21	28	30	26
Collisions.....	125	88	66	50	52	15	26	31	39
Striking obstructions.....	25	17	8	12	10	2	2	1	8
Striking locks.....	5	1	2	2	1	..	..	..	3
Striking bridges, abutments, docks, breakwaters, buildings, piers, buoy lights, canal walls, harbor and channel banks....	48	40	38	38	30	22	28	35	40
Fire damage.....	3	1	4	..	..	1	1	..	2
Explosions.....	..	1	..	..	..	..	1	..	1
Stress of weather.....	9	2	..	2	4	..	1	2	4
Machinery damage.....	12	1	4	1	3	2	..	3	4
Rudder damage.....	..	4	5	1	1	..	..	..	1
Wheel damage.....	..	4	7	..	..	1	3	8	7
Bent and broken quadrants....	..	1	2	..	..	..	..	..	..
Boiler damage.....	2	..	..	..	..	1	..	..	..
Collapsed decks.....	2	..	..	..	..	..	..	..	..
Cargo heating.....	1	..	..	..	..	..	..	..	..
Legal expenses.....	2	..	..	..	..	1	..	..	..
Lost anchor.....	1	..	1	..	..	..	..	..	2
Ice damage.....	1	..	..	..	1	..	..	1	52
Salvage association fees.....	5	..	..	..	..	..	..	..	..
Unknown.....	1	..	..	..	..	..	..	..	..
Broken deck winches.....	..	..	1	..	..	..	..	..	..
Loading rig fell on deck.....	..	..	1	..	..	3	..	..	..
Broken quadrant and rudder..	..	..	..	1	..	..	..	..	..
Cargo shifted.....	..	..	..	1	..	..	..	..	..
Ran over wreck steamer Joliet.	..	..	..	1	..	..	..	..	..
Lost shoe and rudder.....	..	..	..	2	..	..	..	1	..
Flooded: Open sea cock.....	..	..	..	1	..	..	..	..	..
Dented plate.....	..	..	..	1	..	..	..	..	..
Twisted rudder stock.....	..	..	..	1	..	..	..	..	..
Gas explosion.....	..	..	..	1	..	..	..	..	..
Personal injuries.....	..	..	..	..	..	2	..	..	..
Mooring damage.....	..	..	..	..	..	3	..	..	..
Damaged lines.....	..	..	..	..	..	..	..	2	2
Broken steering gear.....	..	..	..	..	..	..	..	..	1
Total losses.....	4	6	3	1	9	..	2	1	1
Total.....	428	235	198	177	150	92	122	133	216

Facts About the Hog Island Yard

An Address by Chairman of American International Shipbuilding Corporation Before Philadelphia Chamber of Commerce

By George J. Baldwin

AFTER ten months of war, the American public is becoming restive and properly wants to know what has been done. The issues pending on the success of our shipbuilding program are too vast and important to be confused by unintelligent discussion and uninformed criticism, and I hope to make clear the reasons for our steady confidence in the rapid progress which is being made by the American International Shipbuilding Corp. as the agent of the Emergency Fleet corporation in the effective and quick production of adequate shipping.

About the middle of last May General Goethals discussed with me the program then laid down by him of utilizing existing shipyards to the utmost for the building of steel cargo vessels, and in addition constructing new yards in which 3,000,000 dead-weight tons could be manufactured in 18 months, and called upon us for co-operation. About a month later the President signed the urgent deficiency act which supplied the means of financing the proposed construction, and we then submitted to General Goethals a tentative plan for his acceptance, which by July was so thoroughly worked out that we were ready to begin work. Owing to conditions familiar to all of you it was not until Sept. 13 that Emergency Fleet corporation was able to finally instruct us to proceed. This unfortunate delay is the primary cause of many of the difficulties and is the definite reason for the large cost of the work.

Let us look for a moment at the task ahead of us on Sept. 13, 1917. American International Shipbuilding Corp., a subsidiary of American International Corp., formed for the purpose with the approval of the shipping board, had undertaken to construct for Emergency Fleet corporation fifty 11½-knot, 7500-ton cargo vessels, each 400 feet long, and upon Oct. 23 was awarded a second contract to build seventy 15-knot, 8000-ton combined transport and freight vessels, each 450 feet long, also it was to build a shipyard suitable for the construction of not less than 200 vessels in which the building of ships might continue as long as necessary on a scale and at a speed never before

attempted by any nation whatsoever.

General Goethals' original plan was the construction of a yard with 50 shipways upon which 200 vessels, all exactly alike, should be constructed. The task has been immensely complicated by the necessity of working

Results in Winter

Everyone who has followed the work in the International shipyard is fully conversant with the tremendous physical difficulties encountered in converting an unimproved tract of shore property into a shipyard with the utmost speed. The nearest approach by trolley or railroad was a mile and a half distant. There were no connecting freight or passenger lines, no water and no source of power supply. By the middle of January facilities, not the best in the world but still unusual as transportation development goes, were at hand, sufficient to carry 22,000 men into and out of the yard. Roadways of standard construction have been built into and through the island, housing facilities for many thousand men completed, administration, engineering and other necessary buildings completed by the acre, freight lines built into the yard and tracks laid sufficient to permit the unloading of 250 freight cars per diem. A water system has been installed and electric power introduced. The essential features of the shipyard, the 50 shipways along the water front, have reached an advanced stage of completion. All this has been done in the face of the greatest railroad congestion ever known and during the most severe winter ever experienced in Philadelphia, a winter in which for more than five weeks the thermometer has hardly gone above the freezing point.

upon its construction during the most severe winter known for many years instead of during the fine weather of the autumn as we had originally planned. After starting work upon the yard, the task was still further complicated and increased in magnitude by the addition of a second

type of vessel of 8000 tons, thus requiring the doubling of many facilities.

The Hog island yard contains about 900 acres, and will have 50 shipways in five groups of 10 each, a fitting-out basin containing seven piers each 1000 feet long with a capacity of four ships per pier. There is not in Philadelphia today a single pier of this length and not many in the country. The classification, storage, holding yards and distributing tracks for material entering into the construction of the 120 ships require 75 miles of standard gage railway track. The covered buildings, such as plate and angle shops, blacksmith shops, machine shops, etc., with office buildings, mess halls, fire stations, police headquarters, living quarters, etc., will include more than 25 acres under roof; 75,000,000 feet of lumber will be used, about half a million tons of steel and nearly 30,000 men will be required as a maximum, a larger force than has ever been organized for shipbuilding in any previous yard.

It is impossible to estimate the cost of such a proposition conducted under its many inherent difficulties, but we believe that the original estimate submitted last June of approximately \$20,000,000 for the yard, which was concurred in by the best judgment of the officers of Emergency Fleet corporation and the engineers of American International Shipbuilding Corp., would have been sufficient if the work could have been commenced at that time. Difficulties in transportation and labor which could not be foreseen and the all-important fact that postponement in starting the work made it necessary to perform the heavy part of it during most severe winter weather will very materially increase the cost of the work.

The total estimated cost of the first fifty 7500-ton boats at \$1,100,000 each is \$55,000,000. The fee for constructing each boat is \$55,000 with certain penalties which may reduce it to \$41,000, one-half payable when each boat is one-half completed, and the remainder when it is accepted by the government. The second lot of seventy 8000-ton boats at an estimated cost of \$1,650,000 each totals \$115,500,000. The fee per boat is \$82,500, perhaps reduced by penalties

to \$65,000. The aggregate estimate for the boats and yard is \$200,500,000, with an additional probable expenditure for necessary housing for laborers of perhaps \$10,000,000 or \$12,000,000.

We have estimated that we can deliver 25 of these boats in 13½ months from Sept. 13, 1917; 25 more in 15 months; another 25 in 18½ months; a fourth 25 in 20 months and the last 20 in 22 months from this contract date which will require an average delivery of one ship every two days during the eight and a half months specified.

The total tonnage so far ordered is 935,000 deadweight tons, capable when constructed of earning at rates fixed and approved by the shipping board chartering committee for steamers of 6000 tons or greater capacity approximately \$10 per ton per month, or, more exactly, \$307,186 per day, or \$9,215,593 per month. You can therefore readily see the importance of saving time as a commercial proposition, as if we can expedite time of construction by one month we save over \$9,000,000 for each month's operation of the fleet, which is only the commercial value of these vessels. What they are worth for purposes of winning the war is beyond computation.

Fee of Approximately \$6,600,000

For doing this work, we are to receive a fixed fee of approximately \$6,600,000, equivalent to 3.3 per cent upon the total expended. From this compensation must be deducted excess profits tax which will probably reduce the final net compensation one-half. The salaries of executive officers, a large staff of highly-paid men, and certain other expenses must also be paid by the company from the fee which it will receive. While not figured on a percentage basis yet, if so calculated the net fee to the corporation will work out to something like 1½ per cent, if indeed it eventually averages that much. There are no indirect profits of any kind.

Much of the work, due to its urgency and the need for speed, must be handled by subcontracts, which have been given to the most experienced and reliable contractors having organizations and equipment immediately ready. All subcontracts are on a cost-plus-fixed-fee basis, the fee being calculated at 5 per cent of the estimated cost of the work done, with certain allowances for depreciation of the contractor's equipment. These contracts, as part of the yard work, bring no profit of any kind to the corporation.

All wages and salaries are fixed by

the government. Materials used are purchased either by the shipbuilder as agent of Emergency Fleet corporation, or, as in the case of lumber, piling, crossties, etc., directly by the government corporation. Every order given is approved in advance as to price and other detail by Emergency Fleet corporation's representatives.

We were instructed to build 50 shipways, together with all the necessary shops and appurtenances, so that not less than 200 vessels could be properly built in the yard.

Let me describe to you the plans

Expect to be on Time

Moreover, I am able today to say to you that, if we can from now on secure a steady flow of material to the yard and if we are permitted to continue with the full program of 50 ways after completing the 32 which we are now pressing forward most quickly, we expect to deliver the ships contracted for at the time originally expected. Furthermore, as nearly as we can now estimate, despite the increase in expenses and despite the delay in time caused by circumstances uncontrollable by anybody, the increased final cost of the 120 ships to be built by us as agent for the government will probably not exceed 10 per cent of their total cost, even charging the entire cost of the yard solely to these vessels.

we expect to convert into reality in the allotted time. The problem was to produce the greatest number of first-class steel ships in the shortest time. They must be cargo ships of ample carrying capacity and satisfactory speed. They could not be built in any of the already overburdened existing yards. Entirely new methods of shipbuilding must be employed, never before used, but none of these things must be experimental. The vessels must be the result in every particular of well-trying methods which our machine shops, factories and shipyards had experimented with and approved in long practice. In answer to this problem three entirely new ideas stood out:

First.—A design so radically simplified and standardized that every succeeding vessel would be an exact reproduction of the first, identical in every detail, thus eliminating every possible variation in size and shape of material.

Second.—The plan required the mobilization throughout the entire country of the largest proportion possible of all resources germane to shipbuilding and the adaptation of these

resources to the new purpose. This included first and foremost the bridge and structural steel industries, then the builders of engines and boilers, the forges and machine shops and factories capable of producing any pieces of equipment entering into a ship from a propeller shaft to a sextant. This meant a mobilization of the men, the plants and the engineers of more than 1000 high-class manufacturing organizations throughout the United States. New organizations could not be thrown together, nor new plants built, to do this work, nor could it all be brought to the shipyard, as the output must be secured from thoroughly organized shops of long experience.

Third.—The reproduction of vessels in large numbers, every one of exactly the same construction, permitted the use of the factory methods in which America is pre-eminent. The new shipyard was to become the assembling floor of a colossal ship factory, whose machinery was made up of all the interrelated wheels of American industry, whose employees were a large part of the entire body of American labor, and whose conveyor belts were the American railways.

This solution both in method and in magnitude was a new departure in shipbuilding. Standardization had been attained to a slight extent in England, but on nothing like the scale demanded by the present program. It required the consolidated and co-ordinated effort of scores of the largest, strongest and most efficient corporations in the United States and could not be accomplished in any other way. Ten or 15 years ago before our industries had achieved their present prominence and size the task would have been an impossibility. Today we are performing it.

Nonessentials Suppressed

All nonessentials have been suppressed. Curvature of plates, especially those requiring multiple bending, were as far as possible eliminated. Ordinary structural steel beams were substituted for special ship shapes. No camber of the decks but flat like those of a battleship; no shear but a straight deck line from bow to stern, perpendicular sides, and a flat bottom, a strictly rectangular midships section only curving on the bilges; a design of boat carefully combining the best ship and bridge builders' practice with that of our most efficient manufacturers. Maximum cargo space was adjusted to maximum safety, utilizing a multiplicity of bulkheads, which have saved more than one torpedoed oil tanker from going to the bottom. This designing has been so accurately and carefully done that the model tested in the government testing tank shows a speed as great and requires as little power as the average vessel turned out in our best shipyard practice.

If fabricated shipbuilding is a success, and there is no reason to suppose that it will not be, the methods of building cargo ships may be revolutionized.

If any one of you will turn to his neighbor and ask him whether or not in four months it is possible to create a satisfactory organization embracing 22,000 people, the answer will unquestionably be no. It would be absurd for me to tell you that our organization of an equal number created in that space of time is fully satisfactory. There are but few organizations of this size in the country, all of which have been the result of many years of growth and careful preparation in normal times of peace. Yet in spite of all that, and in spite of the natural difficulties of the site itself, and in face of the severe winter, one of unparalleled railroad congestion, we are today up to our schedule.

Who is Doing the Work?

Who are the people to whom this great work has been confided? Is it within their power to accomplish it?

American International Corp. has been formed for the purpose of promoting international trade in American bottoms constructed by American shipbuilders and carrying the freight of American merchants to all quarters of the world. It was equipped to undertake great engineering tasks in foreign countries and to finance them with American capital. In carrying out these purposes, it had rescued from destruction the well-known Pacific Mail Steamship Co., now successfully operating the only regular line of importance carrying the American flag between this country and the Orient. It had become interested in other ocean transportation lines and had purchased one of the oldest and best equipped shipbuilding yards in the country, whose force of naval architects, engineers and efficient shipbuilders was second to none, the New York Shipbuilding Corp., of Camden, N. J.

Closely allied with American International Corp. is the engineering firm of Stone & Webster, of Boston (builders of the Keokuk dam and many other important works), which came to the job fresh from a most economical and quick construction of one of the great military cantonments.

We have had one thought and that is to perform this work rightly and quickly. The task is onerous and beset with many troubles. We need, the shipping board needs, and our military and naval establishment needs your individual and collective

moral and active support, without which the work may be hampered and delayed, but with the cordial approval and assistance of all concerned it will be carried to a successful conclusion, and the ships will be turned out on time.



S. H. King Will Revive Chantie

WHERE is the gray-haired deepwater sailor of today who cannot recall the time when the crews of sailing vessels manned halyards, braced yards and sheeted home topsails to the tune of chanties? In the good old wind-jamming days, a well-led chantie was considered of vital importance in aiding the watch on deck to heave and haul in unison. One chantie above all others that gladdened the hearts of the seamen of other days was the one sung while the crew bent over the capstan bars to break out the anchor for a homeward-bound voyage.

Chantie singing has declined the world over of recent years, owing to the change from sailing vessels to steamers, but the practice is to be revived—the American merchant marine is to have an official chantie man, Stanton H. King, Boston. Chanties mean teamwork in pulling on ropes, even aboard steamers, and now that there is an unusual demand for men who can “hand, reef and steer,” chantie singing will again become popular.

Mr. King's work will be to revive chantie singing among merchant sailors who are recruited by the United States shipping board recruiting service to ship aboard the country's new cargo ships. Mr. King is said to be the country's best-known chantie singer. He is a deepwater sailor who first took to the sea 38 years ago, in the merchant service. He also has seen service in the United States navy. In 1886 he sailed on the U. S. S. *ALLIANCE* for a cruise around the world. Mr. King is also an author and has published two books: *Dog Watches at Sea* and *A Bunch of Rope Yarns*.

Book Review

Principles of Ocean Transportation, by Emory R. Johnson and George G. Huebner; cloth; 513 pages, 5x8 inches; published by D. Appleton & Co., and furnished by THE MARINE REVIEW for \$2.50 net.

Many books have been written on the subject, some of them technical and others popular in character, but the writers point out that there is no present volume to which steamship men, shippers and students can refer for a description of ocean carriers and their services, an account of ocean conferences, an explanation of ocean rates and fares and a discussion of the principles and practices of government aid and regulation of ocean shipping.

The book is divided into four parts: The ocean transportation system, the ocean transportation service, the organization of ocean carriers and government aid and regulation of ocean transportation and commerce. The authors discuss each subject thoroughly, as shown by the fact that the work comprises 32 chapters and contains 47 illustrations, 9 maps and 29 standard forms such as shipping permits, ships' manifest, shipping articles, parcels post customs declaration, cargo insurance policy, etc.

The book embodies a thorough discussion of the development of ocean-going vessels; ocean routes; vessel and cargo measurements; port and terminal administration and control; freight, passenger, mail, international express and marine services; pools, conferences and agreements; the relationship between rail and ocean carriers; ocean rates, government aid and regulation; shipping legislation; terminal charges; development of the merchant marine and shipbuilding industries; ship subsidies and other forms of government aid in Great Britain, Germany, France, Japan and other foreign countries, and the merchant marine policy of the United States.

The book is well written in clear, concise language and it is devoid of long, technical arguments which would tend to confuse the layman. The last chapter is devoted to the future prospects for a deep-sea American merchant marine. The policies which must be followed to insure permanence to our suddenly developed merchant marine are outlined at length.

A new record was made recently in the time consumed by a vessel in passing through the Panama canal. The former record was 5 hours 45 minutes, which was reduced to 4 hours 13 minutes by a northbound ship. Later, the record was again lowered by a vessel going south, which made the trip in 4 hours 10 minutes.

In the Traffic Manager's Office

A Review of the Month on Coasts and Lakes—Useful Pointers
for the Men Who Get the Business

U. S. Represented in Allied Shipping

RAYMOND B. STEVENS, vice chairman of the United States shipping board, now in Europe as representative of the interests of this country in the determination abroad of effective measures for the employment of American and allied tonnage, is accompanied on his mission by a staff which includes at least one practical shipbuilder. Members of the mission will remain abroad for an indeterminate period, probably for the duration of the war.

Mr. Stevens will take his place on the interallied chartering committee, which sits at London and Paris and controls all British, French, Italian and neutral tonnage operating under charter to the allies. His mission is one of the results of the allied council last November and was arranged by Bainbridge Colby, representative of the shipping board with Colonel House. This means that the United States is to have a voice in the decisions of the allies relative to the use of shipping more directly than at any time since this country entered the war.

Viewed in connection with the naming of a committee of shipping control on this side of the Atlantic, where the interests of the allies are represented by Sir Connop Guthrie, Mr. Stevens' mission is a significant stride toward pooling the entire allied tonnage.

The shipping board is understood to have under consideration several shipping men for the posts of representatives of the division of operations at London, Paris and Rome. It is expected that Mr. Stevens will be able to make valuable suggestions as to the filling of these posts after he has had sufficient time to survey conditions in the allied countries. He has already been vested with authority to speed up loading and unloading operations in French ports through any agencies which he may create for that purpose.

Before leaving America he conferred at length with President Wilson and the details of the work

which he will carry out will go forward with the direct approval of the White House. His duties are regarded in official circles as being of a dual nature for he has been entrusted with certain diplomatic functions aside from his practical administrative work.

Once the administration had arrived at the decision of sending Mr. Stevens to Europe preparations were pushed forward as rapidly as possible to dispatch him at the earliest possible date. The shipping problem is the most vital one now confronting the allies and its solution demands immediate attention.

Form Atlantic Conference

British, American and French steamship lines have concluded the formation of an alliance which will govern passenger traffic over the North Atlantic. The alliance will be known as the "Atlantic Conference" and replaces a similar organization which existed before the war save that German and Austrian lines have been excluded. The main offices of the organization will be in Paris.

The formation of the new conference may be taken as a definite step toward an after war shipping policy in which Germany will have no dictating power. The prewar conference had its offices at Jena, in the heart of Germany, and held most of its meetings in Berlin and Cologne.

The underlying idea of the organization is protection. A representative of the conference is quoted as saying that, "the primary object is to consolidate, in a commercial sense the interests of the allies who have stood shoulder to shoulder in the war. We must have everything ready when peace is declared to endeavor to conserve business to the allies and to keep control of the Atlantic trade. We know that we have had to suffer in the past through the insidious German penetration, and the manner in which the German lines worked all ways to the prejudice of other nation-

alities in spite of their agreements."

The new organization will co-operate with various sectional conferences which are already in existence, such as the Transatlantic Passenger conference and the Mediterranean-Atlantic conference.

As at present constituted the Atlantic conference includes the following lines: Cunard, White Star, Allan, Canadian Pacific, Anchor, Anchor-Donaldson, Dominion, American Line, and Companie Generale Transatlantique.

Build Grain Barges

Plans for placing 100 large steel barges in operation on the new barge canal to handle 2,000,000 tons of grain during the navigation season, were recently outlined to the senate committee on commerce which has been investigating shipping conditions on all waters.

G. A. Tomlinson, Duluth, head of the Tomlinson fleet on the Great Lakes, has organized a company with \$3,000,000 capital to place these barges in service. It is his plan to unload the grain received from Duluth and other ports at the head of the lakes onto barges at Buffalo from which they will be towed in groups of three through the canal to Albany. A so-called group would have a carrying capacity of 2600 tons.

Approximately 5,000,000 tons of grain passed through Buffalo last year. The present rail rate for grain is 6 mills a ton mile while the small barges now in service on the Erie canal, capable of handling 240 tons of grain each, charge approximately 2 mills a ton mile. Mr. Tomlinson assured the committee that his barges would materially reduce even the latter rate. These figures demonstrate the enormous saving which can be realized through water transportation.

Mr. Tomlinson is a director of the American Shipbuilding Co. He has been a prominent vessel broker in Duluth for several years and until

the government took over the business last fall he chartered a large amount of grain carrying tonnage at the head of Lake Superior.

Nine More Carriers

According to statements issued in the early part of January, nine Japanese carriers have been assigned to the Seattle trade by the Transoceanic Co., Kobe, Japan, to ply between Seattle and the orient.

Five of these vessels reached Seattle during the month of February. The steamship KOAN MARU, which inaugurated the new service on the line sailed from Seattle on Jan. 26 with a return cargo of steel and cotton.

The remaining eight carriers, the SUKI MARU, ORIDONO MARU—a brand new vessel on her maiden trip—TOMIURA MARU, YUKI MARU, KOSOKU MARU, KEISHEN MARU, TENSHO MARU and MALSUURA MARU will arrive at the Pacific port in rapid succession. The first five mentioned were all scheduled to arrive in February; the last three in March. All nine vessels will dock at the new terminal of the Union Pacific system at Seattle. Ralph T. Johns, Seattle manager of the Transoceanic company, said in a recently issued statement that all of the first five vessels would be loaded and cleared for their home port before the end of February.

Port of New York

A steady increase in the receipt of freight for export continues at New York, and the port's every facility is strained to the highest tension. Local officials have done well with the limited amount of money available for improvement, although there has been room for the hand of genius for years. It is now evident that private capital and the close co-operation of New York city, state, and United States officials will be necessary to complete the reorganization of the port's freight handling system to deliver the unprecedented quantity of merchandise arriving daily from all part of the United States and other countries. These shipments are arriving with such confusing regularity that it is almost impossible for steamship companies to assemble cargo for a steamer with any degree of dispatch.

Many operators are organizing their own stevedoring companies, specially to assemble freight intended for export, and barge companies are building many barges for harbor use. Little relief is felt, however, along these lines and it is freely predicted that freight for export will soon be piled high in West and South streets in all kinds of weather if greater progress is not made.

Some confidence is entertained by many shipping men that conditions will improve on account of the organization of the New York and New Jersey port commission which, it is intended, will carry out extensive improvements along the waterfront. It is reported that plans for improvements costing \$500,000,000, are under consideration.

The chairman of the New York commission, appointed by Governor Whitman, is William R. Wilcox. Arthur Curtiss James and Eugenius Outerbridge are members of the board. The chairman of the New Jersey commission is J. Spencer Smith, and De Witt van Buskirk and Frank R. Ford are members. William Leary is secretary of the board and Maj. Gen. George W. Goethals is consulting engineer.

New York has become the leading port of the world, but it is sadly in need of the proper facilities to handle the enormous commerce now offered. For merchandise arriving at the port of New York, the supply of drays, trucks, barges, and warehouses to receive it, is inadequate. The railroads tire of the burden of storing freight after hauling it a long distance and, needing cars for road service, unload the freight along suburban sidetracks, where it waits for the arrival of a steamer and consequently is subject to great damage and in some cases, total loss.

The port's trucking is done by a combination of 1, 2, 3 and 4-horse drays, automobile trucks designed for no particular class of freight and a short supply of barges, old-style steam lighters and coal burning tugs. It is almost impossible to move freight for manifest quickly and without great expense. The arrival of fall crops will more than double the difficulties.

Chicago, New Orleans, Galveston, St. Louis, Baltimore and other large cities have anticipated a steady increase in commerce, and with the assistance of private capital, have constructed mutual terminal railways, warehouses and floating equipment.

It is hoped that the new port commission will proceed without hesitation to interest private capital in the erection of a terminal which will include a system for the interchange of freight, and for the construction of warehouses and of floating equipment, second to none in the world, and thus will give shipping men and steamship companies the service they deserve.

The time for individual effort in freight transfer and storage has passed and team work is now necessary if the dignity and supremacy of the port are to be maintained. Steamship owners and shipmasters are fascinated

with New York, but the loss in business will soon decrease this feeling if the port fails to keep up improvements to meet the ever increasing commerce.

Service to South America

Improvements of the Lindvig fleet's service in the South American trade and the establishment of a new Parr-McCormick service to and from San Francisco are definitely assured according to reports made public in Seattle early in the month. E. McConalogue has opened offices in the Hoge building, Seattle, and will be the local manager for both interests.

The Lindvig interests of Norway are now operating the steamships BAJA CALIFORNIA, REGULAR, GOVERNOR FORBES and SINALOA in the Seattle-South American trade and plan to increase their fleet as soon as war conditions will permit.

The Par-McCormick Steamship Co. established the first week in February a new regular steamship service between Seattle and San Francisco. Six steam schooners have been placed in service. Previous to this no regular schedule had been followed by the company, its Seattle interests being represented only by an occasional vessel.

Navigation School

Establishment of the Washington state nautical school at Olympia, Wash., authorized by the last legislature, was formally announced by Gov. Ernest Lister recently in giving out the appointment of the necessary nautical school board. The board appointees are Frank Waterhouse, Capt. J. S. Gibson and J. D. Trenholme, prominent shipping men of Seattle.

For institution and maintenance of the nautical school the board has a total appropriation of \$50,000 for the biennium, the federal government to furnish a similar amount and a training vessel.

The board was not appointed sooner because no vessel could be promised, but it is believed that this lack will be speedily remedied. The purpose of the board is to instruct youths in navigation. Its headquarters are at Seattle. The board serves without compensation.

W. J. Donaldson has resigned as president of the Philadelphia Barge Co. John J. Turney, former secretary and treasurer, has been elected president and general manager to succeed Mr. Donaldson. D. T. Sheridan, who has been identified with the company since its organization, will succeed Mr. Turney.

Late Decisions in Maritime Law

Legal Tips For Ship Owners and Officers

Specially Compiled for The Marine Review

By Harry Bowne Skillman

Attorney at Law

THE Argentine naval transport PAMPA, regularly enrolled as a ship of the Argentine navy, was in collision off Scotland lightship. In libel for damages resulting it appeared that the PAMPA flies the naval ensign of the Argentine republic, that her officers all hold commissions from the Argentine government as officers of the navy, that her crew are enlisted men of the Argentine navy, and that at the time of collision she was carrying a cargo of general merchandise belonging to private persons. It was held in the decision reported in 245 *Federal Reporter* 137 that the vessel was not subject to libel, it further appearing that the cargo was carried for the benefit of the Argentine republic, and as an incident to her voyage to this country to obtain coal and munitions for the use of the Argentine republic.

"If a drifting boat, that needs rescuing, cannot be stopped and brought to a mooring without involving some damage merely from the force of her momentum, it is impossible to find actionable fault in the efforts of the rescuing boat, which apparently used care and did the proper thing to prevent greater loss."—DANIEL MCALISTER, 245 *Federal Reporter* 183. The same case holds that the mere lying of a boat off a pier end, prohibited by greater New York charter, is not in itself negligence, but the act must be accompanied by other circumstances, such as darkness, with no lights shown, or the creation of an obstacle in the water needed for navigation by any craft using proper care in its movements.

"If a vessel anchors at a point in a channel where, notwithstanding such anchorage, other vessels navigated with care can safely pass, she does not violate the statute (act of congress of March 3, 1899) or render herself liable under the general rules of navigation, although she obstructs the channel to a certain extent. On the other hand, if the anchored vessel occupies so much of the channel as to impede practically its navigation or make the effort to pass her a 'dangerous maneuver,' she has placed herself in a position which the statute forbids, and must take the consequences of her unlawful act." *Strathleven Steamship Co., Ltd., v. Baulch*, 244 *Federal Reporter* 412.

The meaning of the term "moderate speed," as used in Article 16 of the International Rules of Navigation, providing that "Every vessel shall, in a fog, mist, falling snow, or heavy rainstorms, go at moderate speed, having careful regard for the existing circumstances and conditions," was involved in the case of ROBERT M. THOMPSON,

244 *Federal Reporter*, 662, and the court there said: "It is, of course, difficult to define moderate speed in all circumstances but it is safe, we think, to define it as something less than top speed or full speed."

Where services rendered and expense incurred in floating a vessel after it had grounded were at the instance or request of the master, the vessel is liable for all claims, which are not affected by the rule of general average. "The liability so incurred," it was decided in QUERNMORE, 245 *Federal Reporter* 855, was contractual, though what was done to save the ship from the danger to which it was exposed by the stranding constituted a salvage service of the kind which imposes a liability not contingent or dependent upon the success of the enterprise."

Among other points decided in the case of ADAH, 245 *Federal Reporter* 378, are these: The owner of the scow is responsible for the care of the scow by his captain, so far as the loading or observation of her carrying capacity depends upon matters peculiarly within his knowledge, and not ascertainable by ordinary observation of the charterers or of the stevedore. The charter is not a demise, in the complete sense of making the captain the servant of the charterer for all purposes. Stevedores, who undertake to do no trimming beyond that of dumping the cargo upon the deck, must, however, so dump the cargo as to load the vessel safely.

In considering the question of a lien for demurrage, the court, in the case of ELVERS v. W. R. Grace & Co., 244 *Federal Reporter* 705, said: "There is no maritime or common law lien for demurrage prior to loading. The reciprocal relation of the ship to the cargo and the cargo to the ship, is not established until the cargo is on board. After the cargo is loaded on the vessel there is, under the maritime law, a lien on the cargo for demurrage which will then necessarily be incurred only in its discharge. Prior to the loading the shipowner has a right of action against the charterer upon his specific agreement to pay demurrage as provided in the charter party."

In GEORGIANA, 245 *Federal Reporter* 321, it appeared that a fishing trip was undertaken upon what is known as the "quarter lay" plan, that is, the owners were to have for the use of their vessel one-quarter of the net proceeds of the catch, a part of said quarter being due from them to the master; the other three-quarters were to be shared by

the master and the men engaged, in various proportions, bait, ice, and provisions for the voyage being first paid for therefrom. The court held that for the value of their respective shares in the catch taken, the members of the fishing crew have a lien upon the vessel and the catch on board, corresponding to the lien of seamen shipped for hire in the ordinary way, for their unpaid wages against vessel, cargo and freight pending, so long as anything remains of either. The court added: "While the members of such a crew remain bound by their engagement for the trip, they are to be regarded as under contract to do all that it may be within their power to do, whatever the emergency, for the safety of the vessel and catch, and as incapable, like seamen service for wages, of becoming salvors as to the same. As soon as the members of such a crew are discharged from their agreed service, whether formally or expressly, or by implication from the circumstances, and have been thus released from any obligation to exert themselves for the benefit of the vessel, or property on board her, their previous connection with the vessel does not prevent their becoming salvors in respect of any such exertions."

"If an employer requires its employees to work in a place where they may be subjected to the danger and peril of being precipitated into the water, there should be provided devices and facilities reasonably fit and accessible to ward off a fatal eventuation by effecting a rescue if reasonably possible."—*Norfolk & Southern railroad v. Foreman*, 244 *Federal Reporter* 353.

"The authority of the master to bind the vessel itself for supplies, etc., grew out of the necessities of maritime commerce and the business of the ship was to go on. If she found herself in a foreign port, where neither the owner nor master were known, or had individual credit, the right to pledge her for the wherewith to proceed was early recognized as a necessity, and for that reason a lien was accorded him whose labor or capital enabled the vessel thus situated to accomplish the purpose of her being. In such a case the furnisher, in the absence of evidence showing that the supplies were not furnished on the credit of the vessel, was considered as contracting with the vessel herself."—*CORA P. WHITE*, 243 *Federal Reporter* 246.

The Milwaukee harbor association is considering a petition to have the breakwater extended 1500 feet. The petition is based on the fact that vessels are unable to enter the harbor during a gale, and frequently have been delayed.



CHARLES PIEZ
General Manager, Fleet Corporation



EDWARD N. HURLEY
Chairman and President



CHARLES R. PAGE
Member, Shipping Board



GEORGE E. OLLER
Executive Secretary, Fleet Corporation

Theirs is the Task

ON this page are grouped portraits of all of the members of the United States shipping board, together with those of important executives of the Emergency Fleet corporation. These are the men upon whom rests the responsibility for producing sufficient ships to transport, maintain and feed the American army abroad and to relieve the submarine menace to the food supply of our allies. The United States Shipping Board Emergency Fleet Corp. represents Uncle Sam in the ocean transportation business; the Emergency Fleet corporation being the construction agent charged with building the vessels.



LESTER SISLER
Secretary, Shipping Board

Photo Harris & Ewing



RAYMOND B. STEVENS
Member, Shipping Board



BAINBRIDGE COLBY
Member, Shipping Board



JOHN A. DONALD
Member, Shipping Board

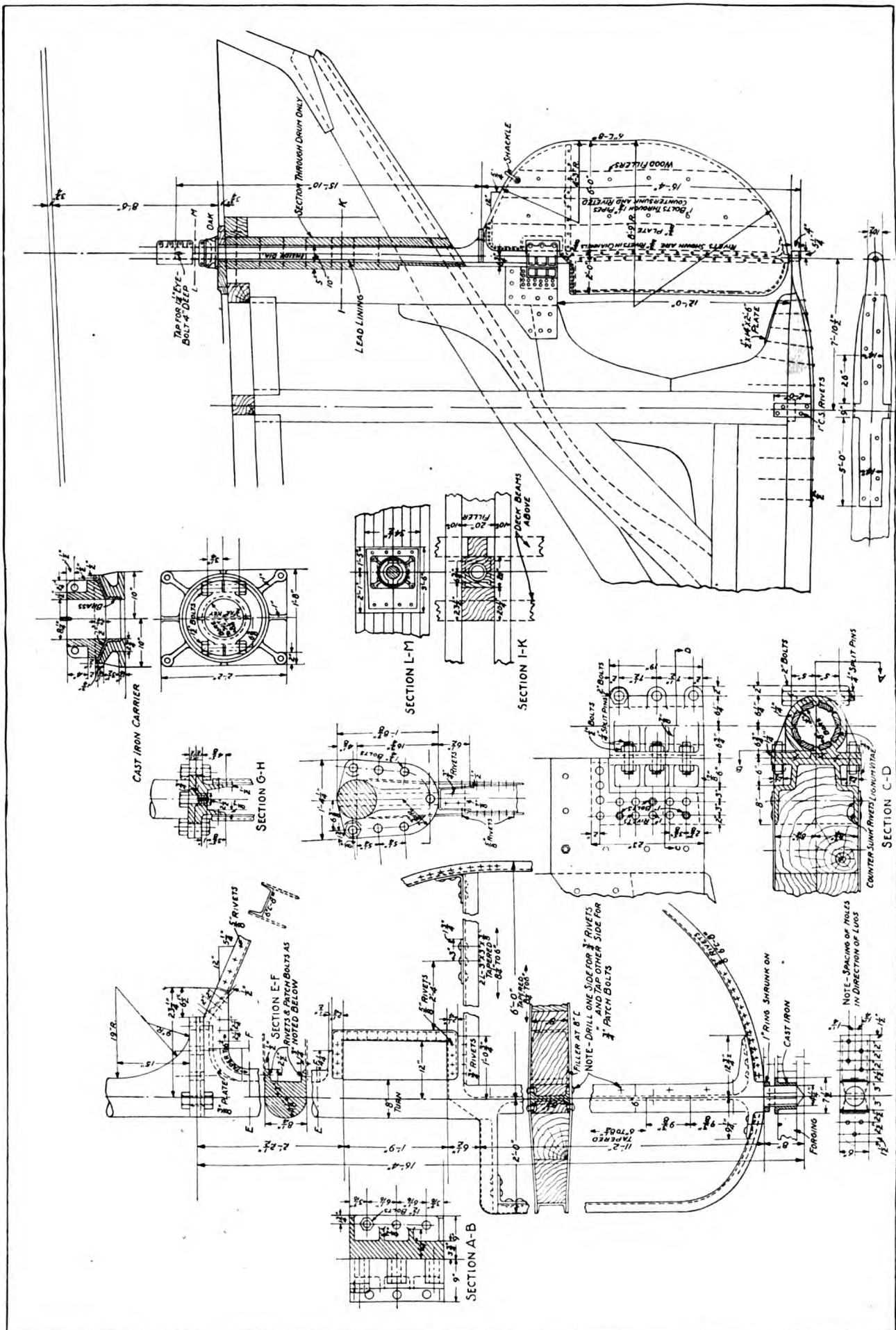


FIG. 180—RUDDER DETAILS OF A 4000-TON WOODEN VESSEL

How Wooden Ships Are Built--X

Details of Working Up Spars—Rudder Design and Construction—Shaft Logs and Stern Tubes—Engine Foundations

By H. Cole Estep

SOME wooden shipbuilders make their own spars; others purchase them from spar specialists. Most of the timber for spars comes from the Pacific northwest on account of the abundance of tall, straight trees free from limbs close to the ground, obtainable in that section of the country. Up-to-date machinery has been employed very little in working-up spars. Skilled men, therefore, are necessary. Figs. 185 and 187 show the essential operations in preparing a spar or mast. For convenience in handling, the rough logs usually are laid on timbers which raise them about 2 feet from the ground. When the shipyard works up its own spars, the logs are purchased peeled. In order to obtain the proper taper, it is first necessary to rough-out the spar with an adz or axe, as shown in Fig. 185. This is a rather laborious and tiresome operation which at the same time must be carefully conducted. After the spar is roughed-out it is planed to a true surface by means of hand planes of various sizes as shown in Fig. 187. Sometimes spars are scraped and sandpapered. Generally, also, they are varnished before being set in place.

Some wooden shipbuilders are now

using steel masts which are lighter than wood, and in some sections of the country more readily obtainable. In the case of an auxiliary vessel, the steel mast also has an advantage, in that it may be employed as an exhaust pipe for the engine.

It hardly need be stated that a rudder is necessary to govern the direction of the ship's motion through the water, the operation involved being termed steering. The rudder, therefore, is a very important part of the ship. Fig. 184 shows a wood rudder of standard type for a large wooden auxiliary vessel. Another type of rudder also used on wooden ships is shown in Fig. 180. This rudder is of the composite type with a cast steel frame and wood filling.

How the Rudder Stock is Coned

Referring now to Fig. 184, it will be seen that a line drawn through the center of a rudder pintles coincides with the center line of the rudder stock. Fig. 184 shows clearly how this result is obtained in the case of a wooden rudder, the lower end of the rudder stock, known as the coning, being trimmed or coned to fit a corresponding cavity in the rudder. Formerly, the fore-side of the

rudder was straight, and therefore the center line of pintles, about which the rudder revolves, was at a distance about equal to the radius of the pintles from the fore-side of the rudder stock. It is evident that a large hole was necessary under these circumstances to permit the rudder to turn through the required angle. The difficulty of making this hole watertight, leather being usually employed, led to the construction shown in Fig. 184.

The rudder itself is built of pieces of timber rigidly edge-bolted together. The after side is protected by an iron strap or forging. Hardwood invariably is employed, iron bark, a dense hard wood obtained from Australia usually being used in the United States. The rudder pintles, usually four in number, are generally bronze castings. They fit into bronze sockets bolted to the rudder post, as shown in Fig. 117, in the chapter published in the December issue of THE MARINE REVIEW. Further details of wooden rudder construction may be obtained by referring to Figs. 102 and 104 in the same chapter.

As Figs. 102 and 117 clearly indicate, the after portion of the rudder-post or sternpost, as the case may

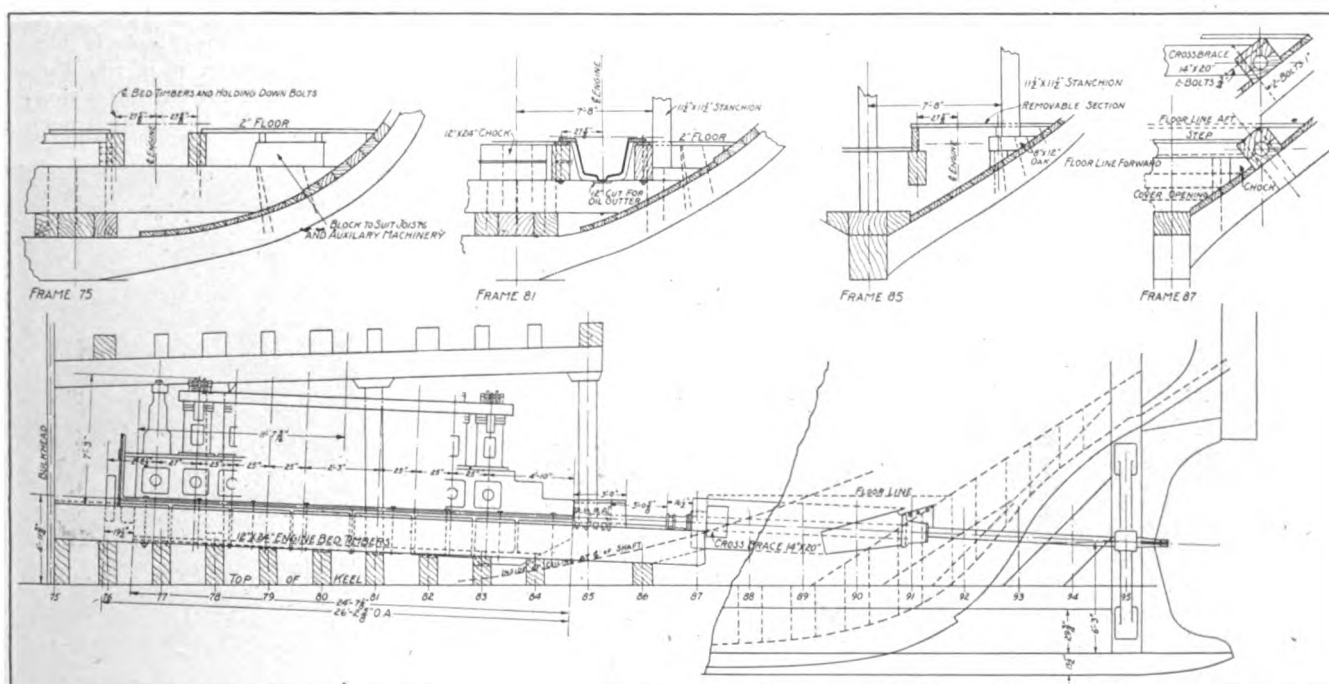


FIG. 181—FOUNDATION DETAILS FOR A TWIN-SCREW OIL-ENGINE DRIVEN SHIP FITTED WITH 500-HORSEPOWER, 6-CYLINDER ENGINES

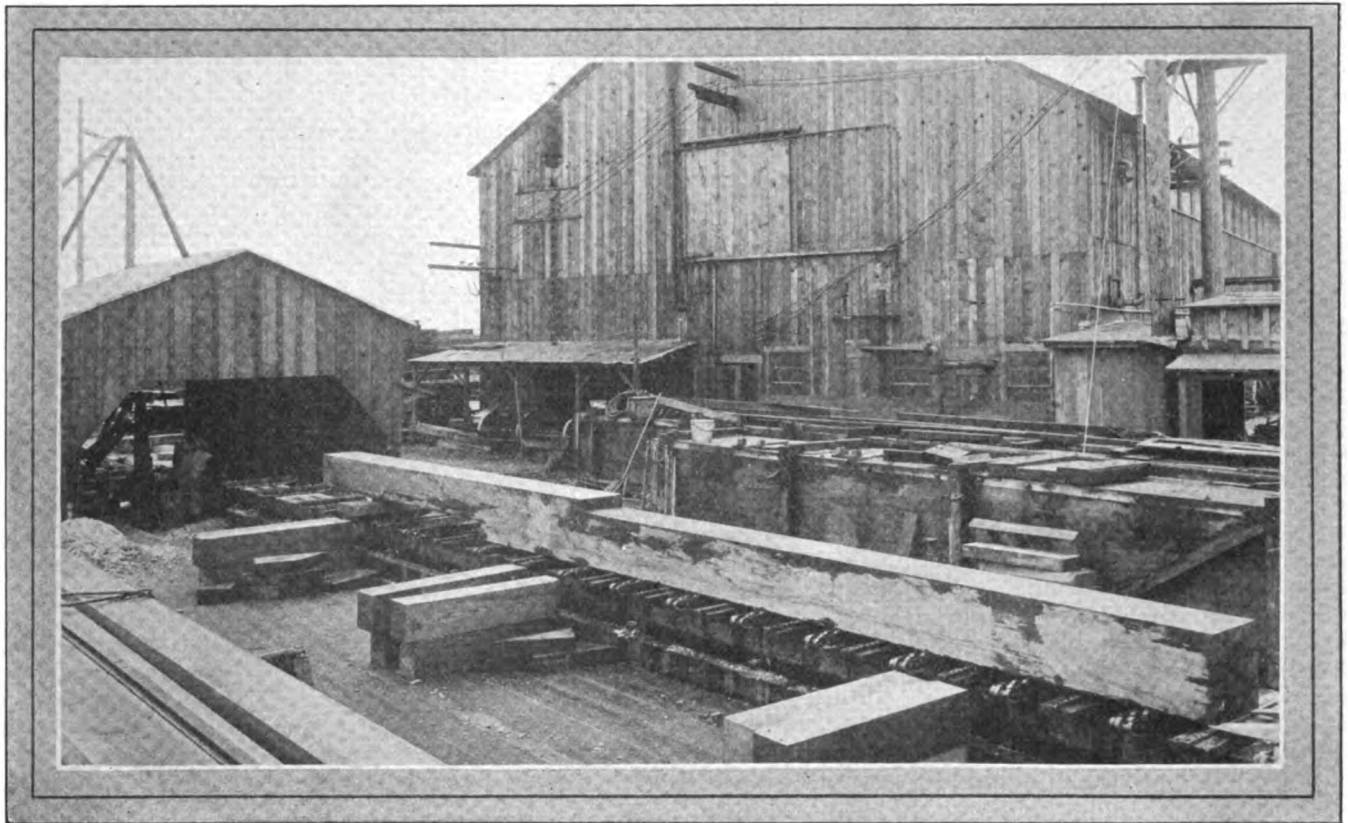


FIG. 182—IRON-BARK RUDDER STOCK SET UP ON A TRAVELING TABLE OF BEVELING MACHINE

be, is trimmed or beveled, similarly to the forepart of the rudder shown in Fig. 184, in order to allow the rudder to turn through the requisite angle. This trimming which is known as bearding, is usually sufficient to permit the rudder to turn about 45 degrees each way, as the angle of maximum efficiency is just within these limits.

The method of setting-off the bearding is worthy of description. Although the line through the centers of the pintles is the axis of rotation, the sides of the bearded portion of the rudder do not radiate from this

line but from the fore sides of the pintles. This is done in order that the bearings on the rudderpost may be placed further aft, thus reducing the amount of wood which must be cut out for the boss to work in. This is especially desirable at the lower end of the post, which in some cases would be cut off to a sliver edge on each side if it were bearded from the center of the pintles.

Machinery Employed

Formerly all of the operations connected with making a rudder were performed by hand. At the present time

machinery is employed for surfacing the various pieces as well as for working up the rudder stock itself.

Figs. 182 and 183 show how heavy iron-bark rudder stocks may be formed on a special shipbuilders' planing, edging and beveling machine. This machine, which has been previously described, is provided with a traveling table for handling timbers. Fig. 183 shows how the stock is placed on chocks sawed to hold it at 45 degrees. After the stock is blocked up in this manner, it is run through the machine and the cutting is done by the top beveling head. Inasmuch as

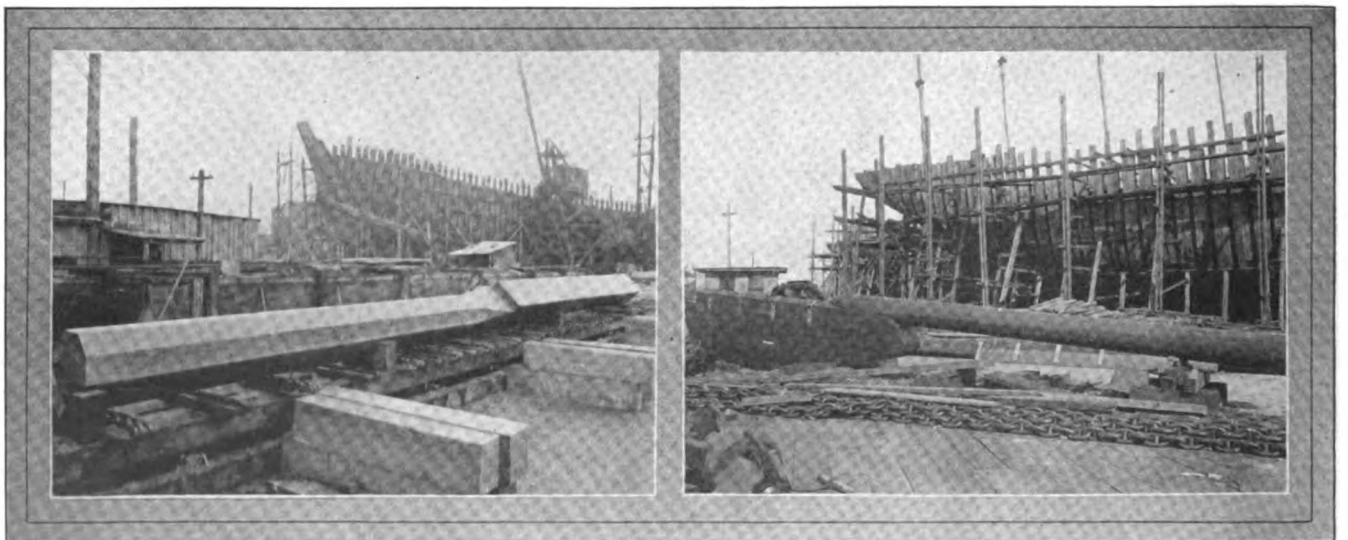


FIG. 183—ANGLE CHOCKS USED FOR TRIMMING RUDDER STOCK ON BEVELING MACHINE. FIG. 184—COMPLETE IRON-BARK RUDDER FOR WOODEN SHIP

the wood is especially hard, comparatively light cuts are taken and each time the carriage is reversed the top beveling head is lowered slightly



FIG. 185—ROUGHING OUT A SPAR WITH AN AXE

by power. This head is provided with a dial indicator which shows its exact position. This operation is continued until the cut is brought down to the desired depth. The rudder stock is then turned so that another corner can be cut down to the same depth in the same manner. By continuing this operation, the stock can be reduced in the machine from the rough to practically a finished condition.

The rudder shown in Fig. 180 is of the balanced type. It extends 6 feet abaft the pintles and 2 feet in front of them. This rudder has an overall height of 16 feet 4 inches. It is supported at the lower end by a cast steel shoe. The rudder stock

is a forged steel shaft turned to a diameter of 8 inches. The pintle bearing at the lower end is turned to a diameter of $4\frac{1}{4}$ inches. The rudder sleeve is lined with lead. The inside diameter of the sleeve is 10 inches and the walls are 5 inches in thickness.

In preparing the engine foundations for wooden ships, the methods vary considerably among different shipyards. The object of the builder in each case is to furnish a firm foundation which will hold the engine securely and keep the shaft in alignment. In wooden vessels, particularly where the machinery is amidships, this question of shaft alignment is a serious one owing to the twisting of the hull in service. In order to avoid the troubles which result from this displacement of the hull, some builders of oil engines recommend the use of flexible couplings of the usual pin and leather-ring type. Some of these builders also place the engines parallel to the propeller shaft, in the case of twin screw boats, transmitting the power through a herringbone gear. This is said to permit the engine to run at a more economical speed.

Solid Foundation

Some builders of motor ships prefer to place their engines on a foundation built of solid 12 x 12-inch timbers. They believe this is necessary in order to fortify the structure against the shocks of pre-ignition. Experience has shown, however, that in the case of well designed engines this is not necessary. A type of foundation for a 6-cylinder 500-horsepower oil engine, which is much more economical of timber than the solid block type is illustrated in Fig. 181. This drawing shows very clearly the various details of the foundation.

In this case, the engine is carried on two 12 x 24-inch continuous foundation timbers. The engine is approximately 26 feet in length over all.



FIG. 187—FINISHING A SPAR WITH A HAND PLANE

Fig. 181 also shows one arrangement of shaft log and stern tube. Two types of stern tubes are in general use. In one design, for twin-screw motor vessels, the propeller shaft is carried through a built-up wood shaft log about 28 inches square on the outside. Sometimes the log is built out of two pieces with a single longitudinal parting. In other cases, four pieces thoroughly edge-bolted together are employed. The log is rabbeted into the planking and ceiling, and caulked tight. It is provided with a lead sleeve and with cast iron caps on each end.

The other design involves the use of a cast-steel sleeve or stern tube

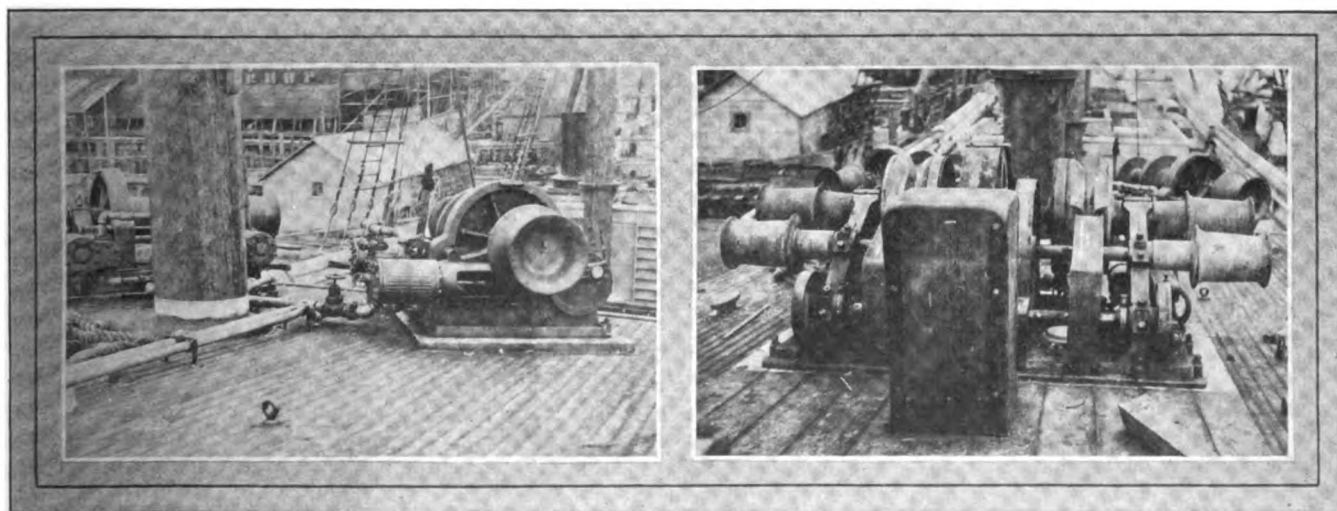


FIG. 186—STEAM-DRIVEN CARGO WINCH INSTALLED ON WOODEN SHIP. FIG. 188—STEAM-DRIVEN ANCHOR WINCH BUILT ON PACIFIC COAST

with bronze liners at each end carrying lignum vitae bushings. The shaft between the bushings is served with marlin. The shaft bearings are bored out to their proper alignment after the log is in place, using a portable electric-driven boring machine. The boring machine usually is driven by a 7½-horsepower motor connected to the boring-bar through a worm gear.

The cost of installing an oil engine in a modern motor ship varies considerably depending on the size of the vessel and the skill of the installing foreman. Generally speaking, it ought not to cost over \$3000 to install two 350-horsepower semidiesel outfits complete with tanks. The job should be accomplished in from 13 to 20 days. Some shipbuilders, however, have spent as much as \$7000 installing two engines, and in one case, at least, fully two months' time was required.

The deck fittings for wooden ships do not differ materially from those

employed on steel vessels. Fig. 186 shows a typical cargo hoist and Fig. 188 an anchor winch installed on a 5-masted auxiliary schooner. Both of these machines are steam driven. Electrically driven winches also are used to a considerable extent, particularly on power driven vessels where it may not be convenient to provide steam. On motor ships, horizontal oil or coal fired donkey boilers with some 480 to 700 square feet of heating surface usually are provided. In some cases, larger boilers have been found advisable, with up to 1000 square feet of heating surface.

Wood vessels are launched in the same manner as steel ships. On the coast or wherever end launching is employed, a cradle is built under both ends of the vessel. This cradle, of course, rests on the standing ways. When the ship is ready for launching, it is raised off the keel blocks by wedges. Then the shores and keel blocks are knocked out transferring

the weight of the ship to the cradle. In some cases the sliding ways are spiked to the standing ways to hold the ship prior to launching. In this case, the ways are sawed apart by two men at the moment of launching. In other cases the usual trigger gear is employed. On the Great Lakes, vessels are launched sideways. The general principles are similar, the ways running athwartship instead of longitudinally.

Vessels usually are painted above the waterline as well as below before launching. In some yards the paint is sprayed on by a pneumatic atomizer. This device saves considerable time and makes it easy for an unskilled man to produce a smooth coat. A large ship will require from 70,000 to 100,000 pounds of paint. In some yards sailing vessels are launched with the masts and most of the rigging in place. In other establishments the hull is sent into the water without any rigging.

British Columbia Shipyards Rushed

BRITISH Columbia shipbuilding, although only started a short time ago, is now one of the province's leading industries. Contracts aggregating \$27,000,000 have been placed with the different companies in that province. These include steel steamers and wooden auxiliary vessels and will be constructed in the yards at Vancouver, Victoria, Port Coquitlam, New Westminster and Quatsino.

Six steel steamers of 8800 tons dead-weight capacity are to be built by J. Coughlan & Sons, Vancouver. Three of these are under construction, and the first is to be completed by the end of the year. Five are for British account and one for Norwegian. The vessels will cost \$1,250,000 each. The original program at the Wallace shipyards, North Vancouver, was for six auxiliary schooners to cost \$150,000 each. Four of these have already been completed. In addition one steel ship has been completed and a second started while a third is to be built. These ships will cost \$650,000 each. The No. 2 yards of this company have been taken over by the Lyall interests of Montreal, Que., who will build six steamers for the imperial munitions board to cost \$350,000 each.

The Western Canada Shipyards on False creek will build six wooden steamers for the imperial munitions board, two of which have already been started. The British Pacific Engineering Co., Vancouver, has a ship-construction program of about

\$1,500,000. The Taylor Engineering Co., Vancouver, has taken up the designing of ships and is building small ships of a total value of \$300,000. The Vancouver Shipyards & Engineering Works has located a yard on Burrard inlet, and will build ships for sale instead of on contract. The Whalen Pulp & Paper Co., with offices in Vancouver, and pulp plants at Mill Bay, Howe Sound, Swanson Bay and Quatsino, west coast, Vancouver island, will build ships for its own export use at Quatsino and will lay down two keels immediately. The Cameron-Genoa Mills, Shipbuilders, Ltd., Victoria, have launched four wooden auxiliary power schooners and will build two more to cost \$150,000 each. They will also build four wooden steamers for the imperial munitions board at a total cost of \$1,400,000.

The Foundation Co. has leased the Turpel shipyard at Victoria and is building five ships for the imperial munitions board at an aggregate cost of \$1,750,000. Yarrows, Ltd., Victoria, are building four shallow-draught vessels for river navigation in India. The British Columbia Construction & Engineering Co. is establishing a shipbuilding plant on Poplar island, New Westminster, and will build four steamers for the imperial munitions board to cost \$1,400,000.

The Pacific Construction Co. has taken over the shipyards of the Coquitlam Shipbuilding Co., at Port Coquitlam, and will build two steamers

for the imperial munitions board, to cost \$700,000. Harrison & Lamond, South Vancouver, have a contract to build an auxiliary schooner for the Dominion government for trade between the Atlantic and Pacific to cost \$150,000. Other concerns having shipbuilding plans are the British Columbia Marine, the Sound Construction Co., the Victoria Machinery Depot and the Westminster Marine Ways.

Difficulty in obtaining seamen to man the many new ships being turned out from yards in Japan, has caused the Yokohama branch of the Japan marine association to establish a school for the training of sailors and stokers.

Japan's three leading shipping corporations, the Nippon Yusen Kaisha, the Osaka Shosen Kaisha and Toyo Kisen Kaisha, are strongly supporting the movement.

It is planned by the Japan marine association to admit 40 students every two months. They will be graduated in that period after being given a preliminary training for sailors and stokers. While they are in the school all their expenses will be paid and they will be given pocket money by the association.

The Japanese government is expected to come to the assistance of shipping corporations and to establish many additional marine schools where men may learn to become masters, deck officers, engineers and stokers.

Our New Ships to be Fully Manned

What the Government Has Done to Train Men For Our Merchant Fleet—A Stupendous Task Successfully Accomplished

THAT the United States is to have the greatest merchant marine the world has ever known is an assured fact. Only a few months ago our fleet of merchant vessels was pitifully small and engaged largely in the coastwise trade. Now the situation is rapidly becoming different—once again old glory is to be seen floating from the ensign halcyons of American ships commanded by American officers and manned by American crews. Not only have we hopes of supplying our troops on European battle fields with all that is necessary to fight to a finish, but in the good days to come the United States will be in a position successfully to compete for the commerce of the world and, as in the halcyon days long gone, America-made products will be carried to the four corners of the globe on American bottoms.

Soon after an adequate merchant marine became an assured fact, the United States shipping board recruiting service undertook the stupendous task of training officers and men to man the armada of vessels now in process of construction. The board recently announced that the plans now being matured reveal a system of preparation in connection with manning the new merchant marine that for thoroughness will not suffer by comparison with any known example of German efficiency.

After securing chief engineers for service on the new fast cargo ships now being constructed under its direction, the shipping board has made arrangements so the men can learn all there is to know about the engines they are to operate, which are of the geared-turbine type. The engineers will be given an opportunity to see the turbines under construction and later to supervise their erection aboard ship. Afterward they will take charge of them as chief engineers, when the vessels go into commission.

Men Paid While Learning

The board probably will first call for 125 chief engineers for this work. While on this special duty, a chief will receive both pay and an adequate allowance for board. On board ship he will receive the standard pay of his grade in the merchant marine, which is high, and a bonus for war-zone voyages.

The demand thus created for the

services of chief engineers is expected to greatly stimulate activity among first-assistant engineers who may wish

America to Emerge Triumphant

AND they said we couldn't do it—we had neither ships nor men to man them. We were looked upon as a nation of dollar chasers to whom maritime activities meant nothing. The kaiser didn't fear us because we were helpless. However, times have changed. From being an impotent nation, as far as a merchant marine is concerned, we soon are to be in a position not only to send millions of men to European battle fields, but to keep them supplied with all that is necessary to make old glory emerge victorious.

And even better things are in store for us. After peace has been declared we will be in a position to compete successfully for the commerce of the world. Once again the stars and stripes will be seen in every port throughout the habitable earth, floating proudly over American ships manned by American crews. We are creating a new industry—our merchant marine of other days is to come back in all its former glory—an industry that is to appeal to red-blooded Americans for generations to come.

American genius, which knows no equal, is solving the problem of turning out ships faster than the under-water boats of the Hun can sink them. Ships without crews, however, are as helpless as troops without ammunition. The officers and crews will be there on time. They are in process of training at this moment. Men who heretofore never saw salt water will soon be efficient deck and engineroom officers. On these men depends success or victory, but they will be trained in ample time; and as citizens of an unconquerable country they will not be found lacking in efficiency or bravery when the time for accomplishing great things is put squarely up to them.

to become chiefs. To assist the men of this grade, or men of lower grades, to secure promotion, the shipping

board invites them to its free schools in marine engineering where they may brush up on technical matters. There are eight of these schools located respectively at Massachusetts Institute of Technology, Cambridge, Mass.; Stevens Institute, Hoboken, N. J.; The Bourse, Philadelphia; Johns Hopkins University, Baltimore; Case School of Applied Science, Cleveland; Armour Institute, Chicago; University of Washington, Seattle; and Tulane University, New Orleans.

Board Has Three Ships

The United States shipping board recruiting service, of which Henry Howard is director, has national headquarters at the Boston custom house. Three training ships are stationed at Boston, the GOVERNER DINGLEY, the CALVIN AUSTIN and the army transport MEADE. The GOVERNER DINGLEY was formerly a coastwise passenger steamer in the Boston-Yarmouth service. The CALVIN AUSTIN, shown in Fig. 1, was previously owned by the Eastern Steamship Lines, Inc., sailing between Boston and St. Johns, N. B. The MEADE was formerly the Atlantic liner BERLIN. These vessels will have permanent headquarters at the new federal wharf, East Boston.

The CALVIN AUSTIN is a modern vessel in every respect. She is a steel steamer, built at Wilmington, Del., in 1903, by Harlan & Hollingsworth. Her principal dimensions are as follows: Length, 298 feet 6 inches; beam, 60 feet 6 inches; and depth, 17 feet 8 inches. Her gross tonnage is 3826 and her net tonnage 2853. Her engine is of the triple-expansion type with cylinders 26, 43 and 71 inches bore by 42-inch stroke; it develops 2700 indicated horsepower. She will accommodate a class of 670 seamen, firemen, oilers, water tenders, cooks and stewards, who will be given thorough training by competent instructors.

The MEADE was built at Greenock in 1874 and was famous as an Atlantic liner for nearly a generation thereafter. She held the transatlantic records, east and west, between Queenstown and New York in 1875, her eastbound record being 7 days, 15 hours and 48 minutes. For that time, this was considered remarkable speed.

She was taken over by the United States government in 1898 when she was given her present name. She

was used as a troopship during the Spanish-American War and after peace was declared she was used intermittently as a transport until about seven years ago. Although she has been laid up for the last seven years she is said to be in excellent condition. She is a staunch craft today, in spite of her 44 years. Seafaring men say that she is well adapted for a training ship.

Will Be Thoroughly Repaired

Her hull is sound and tight and practically all the repairs she needs are on her upper works. She is to be thoroughly repaired. This work will take about a month. It is said that she may be stationed for a time at Newport News before being transferred to Boston. At Newport News she will be used as a receiving ship for apprentices.

It is interesting at this time to learn that organized labor appears to be doing all in its power to co-operate with the government in helping to man the new merchant fleet. At a conference recently held at Washington between Mr. Howard, director of recruiting, and Andrew Furuseth, president of the International Seamen's Union of America, matters were discussed having a direct and important bearing on the subject.

The chief subject considered was the manning of the new ships, but underlying this was the general problem of making the merchant service attractive to young Americans, who for many generations have not been inclined to consider the seaman's career a promising one. At the annual convention of the Seamen's Union of America, at Buffalo in December, a committee was appointed for the purpose of co-operating with the shipping board in obtaining skilled seamen for the new ships and in the training of men and boys in anticipation of the demand for seamen when the new ships begin to take the water in large numbers.

Aside from the vessels previously mentioned, the shipping board has another ship under requisition for its training squadron. This vessel is now undergoing repairs at New York. These four ships will have a capacity of approximately 2300 apprentices who will be trained for all the ordinary branches of the merchant service, that is to say as sailors, firemen, water tenders, oilers, coal passers, cooks, stewards and messmen. The training period, with intensive instruction, will vary from a month minimum for fire-



FIG. 2—CAPT. I. L. EVANS EXPLAINS THE SEXTANT TO A STUDENT

men to six weeks minimum for seamen and it will be followed at once by actual service at sea.

The officers for the new merchant marine are now being trained at the shipping board's schools in navigation and marine engineering at various ports. About 600 are under training. The school term is one month for engineers and six weeks for deck officers. More than 4000 new officers have been licensed since the United States entered the war.

One of the first things a student officer is taught is the use of the sextant. Fig. 2 shows Capt. I. L. Evans, recruiting chief for the Great Lakes explaining the mysteries of this instrument to an embryo officer. The

first thing this student is taught is to work out an index error and before many weeks will have passed he will know how to take chronometer sights, how to take the altitude of the sun, moon or stars for latitude and how to compute latitude and longitude according to Sumner's method.

An interesting feature about the training ships of the United States is that the entire personnel will be American citizens. This decision was announced recently by the shipping board, and it means that American seamen will be trained by American officers to man American ships.

Druggists to Help

New England druggists to the number of 526 have volunteered for war duty as recruiting agents for the merchant marine. This statement was recently issued by Mr. Howard. These druggists are scattered all over New England. At a recent convention held in Boston, 200 druggists took the oath of office as special representatives of the shipping board and others have since been sworn in.

Each of the 526 druggists will conduct an enrolling station at his store at which young Americans from 17 to 27, inexperienced in seagoing, may put their names to applications for training. The co-operation of the druggists with the shipping board was brought about through the initiative of Louis K. Liggett, Boston.

Official announcement was made lately by Mr. Howard that under a recently issued regulation of the provost marshal general's department, all students entering shipping board schools for training as deck officers or engineers will be exempted from military duty and they will remain exempted as long as they pursue the calling for which the school fits them. This decision affects 600 or more students now in shipping board schools and it will apply to all student enrolled in the future. On graduation, a student is either sent to sea, for further training as a reserve officer in the merchant marine, or is licensed at once for the grade to which he is eligible.

The last Occidental captain has gone from the bridge of Japanese steamers with the appointment of Capt. Stanley Smith to a shore position in Yokohama. An order has been issued by the Japanese government that all subsidized vessels must carry only Japanese officers. This order eliminates American and English pursers and chief stewards. The only concession made by the Japanese government is that an American doctor may be employed on the steamers.

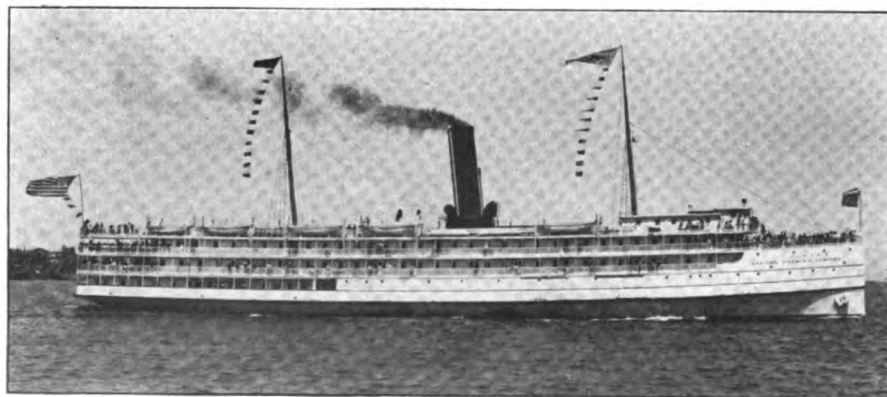


FIG. 1—THE FORMER COASTWISE STEAMER CALVIN AUSTIN NOW A TRAINING SHIP FOR OUR NEW MERCHANT MARINE

American Ship Yard Activities

A Snappy Summary of the Leading Events of the Month in the
Vessel Construction Field

Saginaw Shipyard Built in 60 Days

FROM a river bank swamp to a complete shipbuilding plant in 60 days is the record of the Saginaw Shipbuilding Co., Saginaw, Mich. Not only was this accomplished but the original plan was greatly enlarged as work proceeded and the complete plant was turned over for work in the specified time in spite of the changes. Within 50 days from signing the contract the Saginaw Shipbuilding Co. had machines in operation in some shops and five of the 12 buildings were complete and being used. The remainder were completed in the next 10 days.

The contract was placed with Frank D. Chase, industrial engineer, Chicago. To avoid the delay which would have been caused by inability to obtain steel for the two larger buildings, a timber truss was substituted, necessitating a change of plans but saving considerable time. In the mold loft building, 60 x 160 feet, and the fabri-

cating shop, 120 x 160 feet, timber trusses were used. In the latter building cranes of 10-ton capacity are carried on heavy trusses.

When the contractor started his work, seven buildings were planned. When he completed the plant, 12 had been erected and practically every one had been increased in size from the original plan.

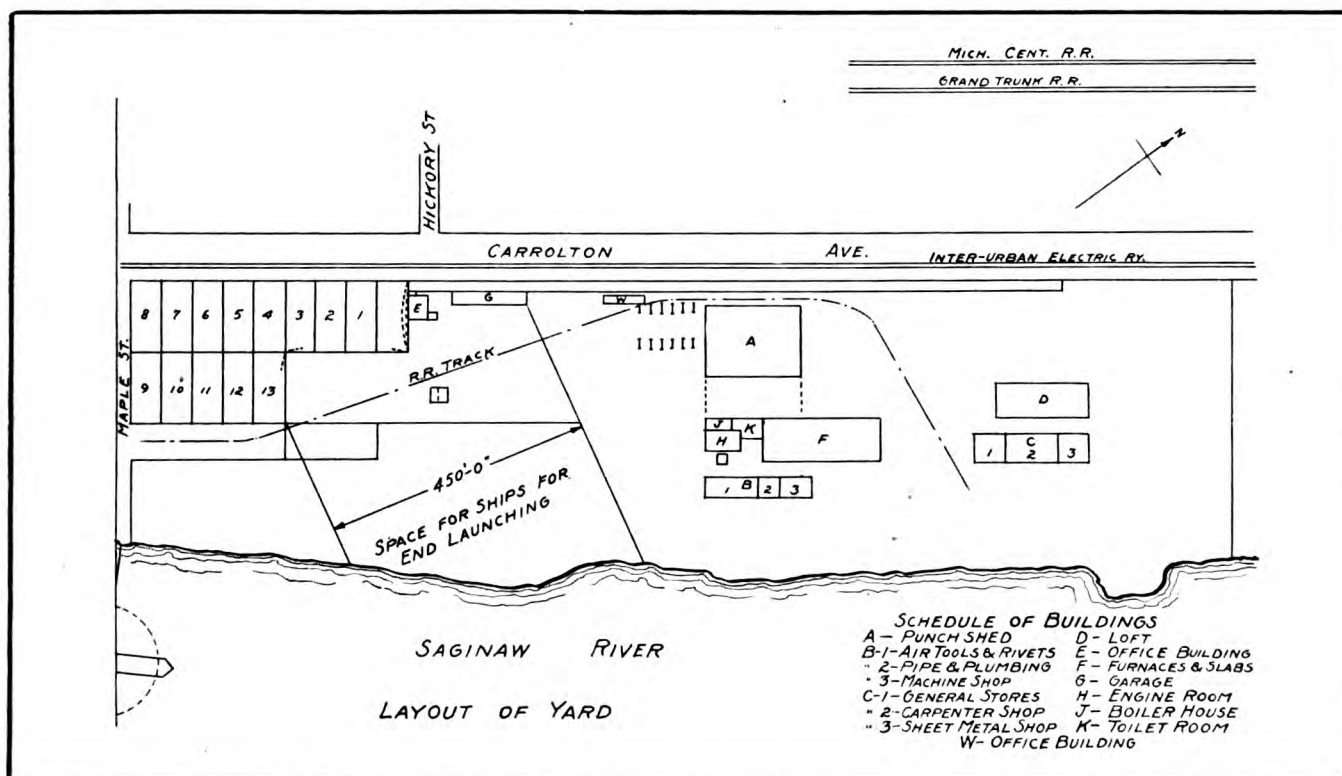
Starting with a swamp on the Saginaw river, it was necessary to grade for the buildings and the ways, to build roads and lay switch tracks, to bring water supply and electric power lines from the city and to import labor from three states and find housing accommodations.

The 12 buildings include a punch shop; machine, pipe and rivet shop; sheet metal and carpenter shop; loft; office building; furnace building; garage; engine room; boiler room; toilet; lunchroom; shop office building.

Equipment for the building was also

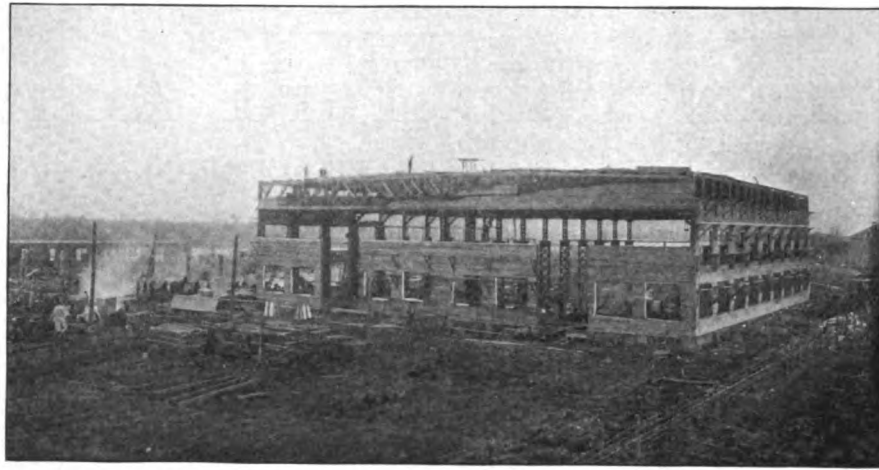
ready when they were completed and operations were started as soon as a machine was installed. In the fabricating shop, a 10-ton crane serves the floor, with auxiliary cranes for local work. Punches and shears also are installed. The storage yard adjacent is provided with a crane runway as well as locomotive cranes. The loft building, which has a 60 x 160-foot clear span with timber roof girders, has a soft pine floor for laying out work. The furnace and slab building is equipped with oil-fired furnaces. Jib cranes assist in handling material. This structure is 75 x 200 feet.

The Saginaw Shipbuilding Co. was organized in July, 1917, with \$350,000 capital, to build and repair all kinds of water craft. F. W. Wheeler is president and general manager. He formerly was president of the Bay City Shipbuilding Co. and is one of the pioneer shipbuilders on the Great



GENERAL ARRANGEMENT OF YARD OF SAGINAW SHIPBUILDING CO.

Lakes. W. J. Wickes, chairman of the board of directors, is also a large boiler manufacturer and is interested in other Michigan enterprises. Walter C. Hill is treasurer, and C. W. Stiver secretary. Mr. Stiver has been associated with Mr. Wheeler in shipbuilding for 15 years. The company has a contract from the government for six steel ships for the Emergency Fleet corporation. They are of the standard type modified to pass the Welland canal, 260 feet long, 43½ feet beam, molded depth 24 feet 4½ inches. The contract calls for delivery before November, 1918. In view of the speed in getting under way, delivery before the contract date is expected. The plant occupies 20 acres on the



NEW PLANT OF SAGINAW SHIPBUILDING CO., SHOWING USE OF LUMBER OWING TO INABILITY TO OBTAIN SATISFACTORY DELIVERIES ON STEEL

Saginaw river with 2000 feet of river frontage. The river offers ample depth for launching craft of the draught specified for these vessels.

Cruiser Changed to Merchantman

The third-class cruiser BOSTON, which was included in Admiral Dewey's

herself, as she still looks much like a war vessel. She retains her ram bow for use in case she is attacked.

The vessel will retain her old name and Capt. Frank Mills, a veteran mariner of the Pacific coast, has been assigned to her command by the shipping board. As a freighter, the BOSTON will carry approximately 3000 tons of cargo.

Manila fleet in 1898, has been rebuilt and converted into a merchantman. The alterations were made by the Seattle Dry Dock & Construction Co., Seattle. The government turned the vessel over to the shipping board, during the summer of 1917, at Bremerton, Wash., and later she sailed to Seattle for reconstruction. As an American cargo ship, the BOSTON is in a class by

Latest News from American Shipyards

The papermaking plant of the Colonial Paper Co., Portsmouth, N. H., which was closed several years ago, has been purchased by the Atlantic Engine & Shipbuilding Co., New York and Boston. It is announced that 10 steel merchant ships for government use will be built. The plant is located on Freeman's Point, the site many years ago of shipyards where wooden sailing vessels were built.

C. M. Englis, Inc., New York, announces that it has succeeded to the business of C. M. Englis and John Englis & Sons in shipbuilding, joiner work, all classes of ship superstructural work, general ship contracting and repairs.

Contracts for two more wooden ships were signed recently by Capt. John L. Anderson of the Anderson Shipbuilding Corp., Houghton, Wash. The vessels were ordered by Hannevig Bros., Norway. This gives the Anderson company a total of four contracts. The first two ships are under construction and are for New York interests. They are wooden steamships. The recent contracts call for the construction of two motorships, each 270 feet long with a deadweight cargo capacity of 3000 tons.

A review of operations in Maine shipyards since the early summer of 1917 shows an output of 28,369 net tons, notwithstanding that the work has

been greatly delayed by the difficulty of obtaining materials and the scarcity of skilled labor.

The United States Steamship Co., Inc., has decided that its Alexandria, Va., plant will be known as the Virginia Shipbuilding Corp.

Building operations now in progress, or contemplated, insure a much larger output of merchant tonnage in 1918. At Bath, several large schooners and steamers are being built, or are under contract. In the Rockland district nine vessels, large and small, are on the stocks. At Belfast a 4-mast schooner of 1000 tons and a 5-master of 1800 tons are building, while the 4-master AGNES E. WILCOX, a vessel of 700 tons, is scheduled to be launched early in the year at Stockton Springs.

At Sandy Point a new yard has been equipped where several 3500-ton wooden steamer hulls will be built. At Millbridge, the Sawyer Shipyards Corp. will build at least one 4-mast schooner of about 600 tons, while the Frye-Flynn Co. is getting out the frames for two 4-mast and two 5-mast schooners. One or more of these vessels will be built at Harrington.

At South Portland several wooden steamers will be built for foreign account. Five shipyards along Casco bay have contracts for several vessels each. A 3-mast schooner is to be built on the Saco river and several 3-mast

schooners will be launched at Boothbay harbor during the next six months. Waldoboro will contribute one or two large vessels.

Bids have been asked on 4000 metallic steel-keel lifeboats which, it is estimated, will cost more than \$1,000,000. These boats are being sought by the United States shipping board. The lifeboats will be 24 to 26 feet in length and 7-foot 9-inch beam. In submitting the estimates, boatbuilding companies were requested to state the thickness of the metal to be used in construction and fully to describe its physical properties.

Articles of incorporation of the Seattle Shipping & Construction Co., with a capital of \$600,000, were recently filed in Seattle. It has been announced unofficially that the company has acquired 100 acres of land on Lake Washington. W. H. Grosjean, T. E. Young and Thorwald Siegfried appear as incorporators of the new company.

The shipping board recently took over the steamship SEATTLE at the close of her trial trip. She was delivered to the government by the Skinner & Eddy Corp., Seattle, exactly 96 working days from the time her keel was laid. Capt. R. H. Bagott, one of the foremost Seattle navigators of the younger generation, commands the vessel for the shipping board.

How Coal Fleet Was Kept Moving

Efficient Methods Enable Big New England Industrial Plants to Obtain Coal—Barges Were Routed Systematically—Ice Caused Much Delay

By George S. Hudson

HEROIC measures have been resorted to by Capt. Arthur Crowley of Boston in carrying out his work as director of the coal-carrying fleet charged with securing for New England a share of fuel in face of the worst conditions within memory of the present generation. Capt. Crowley, by routing barge and steamer traffic, brought system out of chaos and enabled big industrial plants to operate when it was feared all business must suspend with consequent halt in output of ships and munitions.

Capt. Crowley, it will be recalled, is identified with the Coastwise Transportation Co. of Boston, which a few years ago began construction of a number of steam colliers to augment tonnage represented by a fleet of schooners, including the steel seven-master THOMAS W. LAWSON which met her end on the Scilly rocks a decade ago while transporting oil in bulk to London. Of late, Capt. Crowley has superintended construction of steamers built for his concern at Camden, N. J., afterward taking them on maiden voyages.

Now, as director of the coal-carrying fleet, Capt. Crowley has an office on State street, and directly represents the Emergency Fleet corporation of the shipping board and the selection meets with favor both at Washington and with the coastwise operators of tonnage. Every move of tug, barge and steamer is hourly recorded by means of a huge chart on a wall of Capt. Crowley's office, the main idea of the chart no doubt having been suggested by the experience of railroad dispatchers. Thereby it is instantly possible to trace any craft assigned to the work of transporting fuel and, as the vessel nears port to have her berth ready or, perhaps, to meet an exigency, divert the cargo to some other point where it may be more urgently needed.

Using Tugs Efficiently

Heretofore movement of empty barges has been more or less spasmodic and the resulting delays militated against the best service. For illustration, a tug from Hampton roads would have a barge for Boston, another for Portland, and a third, say, for Eastport. The string might be broken up and taken to destination

by the same powerful tug with tremendous loss of time to that vessel as the tug could be employed much more profitably, hauling loaded barges from the coal ports to a central point where they would be dropped and delivered by a bay tug while the big tug at once picked up a string of empties and steamed back.

Capt. Crowley has systematized the barge traffic so that empty craft are collected by small tugs and a string is generally ready for sea. Delay in discharging coal cargoes is not permitted as in the past and consignees hustle the fuel into their pockets so



CAPT. ARTHUR L. CROWLEY

that the plan of keeping barges in constant operation may not fail. This arrangement without question saved the day for New England, although shortage of fuel on one occasion made it necessary to stop delivery of coal to office buildings for a 48-hour period when bitter weather conspired with gales to slow down receipts of fuel, which were exceedingly irregular, one day finding a total of say 30,000 tons arriving with none during the next few days following.

Never, within recollection of Capt. Crowley, has the coal-carrying fleet been subject to more exasperating delay in face of alarming shortage that involved a considerable section of the seaboard. Steamers were nipped by ice in Chesapeake bay and literally frozen in. It

was impossible to move them to loading berths where coal in abundance was to be had for the taking. Then, when the ship managed to get alongside it was impossible to dump cars into the chutes because low temperatures caked the fuel into a solid mass which would let go only when steam was used to thaw it out. Ordinarily, a steamer of 6000 tons of type similar to the MALDEN, MELROSE, or NEWTON, long identified with the coastwise traffic, may be loaded in seven hours or less, but the weather prolonged the operation to almost that number of days.

Ice in Vineyard Sound

Finally the delayed vessels crept out by Cape Henry and headed for Boston, 600 miles distant. More ice was encountered and the accumulation increased to such extent in Vineyard sound that the steamers were in danger of being forced on the shoals. Similar conditions confronted colliers at Philadelphia, delay on account of ice in several instances amounting to two weeks. But the tugs and barges suffered most in the Arctic weather, being stalled days on end while New England clamored for their arrival with bins down to sweepings, show windows darkened and the population getting down to cordwood and kerosene. Boston requires about 10,000 tons of coal each 24 hours and the railroads were supplying hardly enough fuel to talk about. But Capt. Crowley, possessed with patience born of many a winter afloat in steam and sail, declared the situation would be brighter with higher temperatures and gentler breezes.

When conditions were about as dark as one could imagine, the shipping board released a number of steamers to aid shivering New Englanders and the navy department loaned the *ACHILLES*, a 13,000-ton collier to help out. This augmented fleet bucked ice while tugs forced a channel through the Cape Cod canal for the passage of tows. Thus, at length, triumph was won over a desperate situation.

As a result of the shipbuilding boom, Astoria, Oreg., has doubled in population in the last two years. The city for nearly 10 years had a population of 10,000 to 11,000. Now the figures exceed 20,000.

On the Coasts, Lakes and Rivers

What's Doing and Who's Doing It

Many Ships Damaged in Battle With Ice

By M. H. Kinkhead

ICE conditions Jan. 30 forced the suspension of navigation between Milwaukee and Chicago for the first time in 50 years. All deck laborers and office employees of the Chicago, Milwaukee & Racine line and the Goodrich Transit Co. have been laid off until April 1. The steamer *INDIANA* was caught fast off Racine, and her freight had to be removed by teams and sleighs driven over the ice.

The steamer *WAR DUTY*, building for the Emergency Fleet corporation, was launched at the South Chicago yard of the American Shipbuilding Co. Jan. 31. The vessel is full Welland canal size, and will start for the coast at the opening of navigation.

The steamers *SENACA* and *BETHLEHEM*, formerly owned by the Lehigh Valley Transportation Co., Buffalo, have been commandeered by the United States shipping board and sent to the coast.

The steamer *CHARLES S. HEBARD*, of the Wilson Transit Co., which sailed from Cleveland for Milwaukee in December, has been forced to put back from Mackinaw and unload her cargo of coal at Port Huron, Mich., on account of the heavy ice formation encountered. Capt. C. H. Francke is master of the *HEBARD*.

The carferry *MARQUETTE & BESSEMER No. 2*, which recently had several plates damaged in a battle with the ice in Lake Erie, has been taken to Erie, Pa., where she will be repaired and laid up for the winter. The collier *MARQUETTE & BESSEMER No. 1* will also spend the winter at Erie.

The 600-foot steamer *ZIESING*, of the Pittsburgh Steamship Co., which was ordered for 1917 delivery and did not come out, will be ready to sail at the opening of navigation. She will increase the fleet's season capacity by about 300,000 tons.

Ice formations caused the carferries *ASHTABULA* and *MAITLAND* to lay up for the winter at Ashtabula 15 days earlier than usual. The steamers reported the toughest battles with the ice for many years.

The total movement of hard coal for the past season was 4,689,983 tons, which represents an increase of 266,193 tons over 1916. Grain figures total 7,000,000 tons and unofficial reports indicate that about 5,000,000 tons of stone were moved. The last figure is significant as it reveals the important place

the stone trade is coming to assume in lake transportation. In previous years the bulk of the stone cargo has been carried in barges and wooden vessels, but the past season has seen several fair-sized and some large steel steamers used for this purpose.

Four steamers which were caught by early ice formations in the St. Lawrence river have suffered from lack of provisions. Three of the steamers are the *KEY WEST*, *CICOA* and *GERMAN*; the fourth is unidentified. Wireless messages from the *KEY WEST* report that her boilers are disabled, her rudder gone and her food supply exhausted. The Canadian government icebreaker *MONT-CALM* has been sent to attempt a rescue of the distressed crews.

Eighty new vessels passed through the Welland canal on their way to the coast during 1917. In addition, 20 vessels were taken through in sections, of which two were new steamers.

Capt. John C. Pringle died at his home in St. Clair, Mich., Jan. 25, aged 80 years. During the greater part of his life Captain Pringle was identified with the lake trade, as a master and owner of lumber carriers.

The shipping board has taken over the bulk freighters *SAXON*, *ROMAN* and *MANOLA*, of the Pittsburgh Steamship Co., and E. C. POPE, of the Lake Transit Co., Bay City, Mich. All four of the steamers will be cut in two for passage through the Welland canal on their way to the coast. The *MANOLA* and *ROMAN* are being refitted at South Chicago, the *SAXON* is laid up at Detroit and the *POPE* will be cut in two at the yard of the Toledo Shipbuilding Co., Toledo, O. The *POPE*, the largest of the four steamers, has a capacity of 4100 tons, and is 317 feet long and 41 feet beam. The other three steamers carry 3300 tons each.

The steamer *LOUIS R. DAVIDSON*, of the American Steamship Co., has been docked at Ashtabula for repairs. The *DAVIDSON* collided with the steamer *NORWAY* in December, shortly after being released from the rocks at Vidal shoal, on which she ran aground.

Capt. Caleb S. Fitts died Jan. 29 at a hospital in Toledo, O., as the result of an automobile accident. Captain Fitts was 65 years old and was well known over the Great Lakes in the days of sailing vessels. Later he was master of several tugs, and last season he commanded the yacht *CAROLINE*, owned by

Edward Ford, and regarded as one of the finest on the lakes.

The steamer *ALABAMA*, of the Goodrich Transit Co., is in drydock at Grand Haven, Mich., for repairs made necessary by her attempt Jan. 29 to break through the ice floes in Muskegon lake, when she broke a propeller blade. The *ALABAMA* had just been released after being fast in the ice of Grand Haven harbor for two weeks.

James J. Lynn, formerly of Port Huron, Mich., who is well known on the lakes, has been appointed district officer for the United States shipping board, in charge of wooden ship construction. Mr. Lynn is stationed at Baltimore.

Henry McMorran, Port Huron, Mich., has sold the steamer *PAWNEE* and the barges *MINNIE E. ORTON* and *J. R. EDWARDS* to the Montreal Transportation Co., Montreal. The *PAWNEE* will be fitted for wrecking work and the barges will be used in the lower St. Lawrence river as lighters.

James A. Oag, formerly chief engineer of the steamer *C. RUSSELL HUBBARD*, has been appointed fleet engineer and marine superintendent of the Richardson fleet.

The steamer *GEORGE A. VAN VLECK* has been sold to Thomas Norton & Co., New York, who will use her in the coast trade. The steamer is being rebuilt at Toledo and will be sent to the coast at the opening of navigation.

Capt. William B. Massey, for the last 15 years master of passenger boats in the St. Lawrence river, died Jan. 20 at Ogdensburg, N. Y., at the age of 60. Captain Massey was a brother of Capt. Samuel Massey, master of the steamer *D. R. HANNA*. In the earlier days he was in command of sailing vessels on the lakes.

Harry Coulby, president of the Pittsburgh Steamship Co., recently presented E. D. Purdy, first mate of the steamer *CRESCENT CITY*, with a watch, and Arthur Knutson, second mate, Walter J. Cooper boatswain, Wilbur E. Easton, John Jones and Richard C. Grimsley, wheelmen, with gold medals, in recognition of their bravery in attempting to rescue the crew of the steamer *DESMOND*, which foundered off South Chicago, Dec. 8, 1917. The rescuers worked in extreme cold and a heavy sea, and in spite of their efforts seven of the *DESMOND*'s crew were drowned.

The capacity of British ship repair yards has greatly increased in recent months under Henry M. Grayson, who was appointed last year as director of ship repairing. In June 10 ships damaged by enemy action were being repaired. In December there were 56. The first figure represented 27 per cent of the total salved tonnage on hand, and the second figure 80 per cent. On Nov. 1 the United Kingdom dry docks were being used for 90 per cent of their time,

but throughout November the percentage of 94 was reached. Since August, when the system of centralized control was introduced, the output of ships repaired in dry dock had increased by 48 per cent and the repairs afloat by 45 per cent.

The Federal Homes Corp., Jersey City, capitalized at \$2,000,000, has been incorporated at Trenton, N. J., to provide housing accommodations for workmen

of the Federal Shipbuilding Co., the Foundation Co. and other large industrial concerns in Jersey City, Newark and the Newark Meadows. Charles L. Decker and J. Harry Miller, of Jersey City, and Herbert Gren, of New York, are directors of the new company, which, though organized primarily with the support of private capital, will, it is stated, probably receive assistance from the government to carry out its plans.

Along the Atlantic and Gulf Coasts

BOSTON harbor was filled with ice during the greater part of January with consequent delay to shipping. Not for a generation had such conditions obtained and a score of tugs that tried to force channels were sent to repair yards with propellers broken or machinery disabled. To add to general discomfiture of seafarers, a high tide inundated the water front and caused considerable damage. While the normal rise was indicated as 11.1 feet, the tide did not stop rising till it had reached 14 feet. The previous high point was Dec. 26, 1909, when the water rose to 15 feet and the so-called Chelsea flood resulted.

Capt. H. M. Decker, for years in the employ of the Eastern Steamship Lines, Inc., has resigned to take charge of the steamer CALVIN AUSTIN, taken over by the government to be used as a training ship for seamen of the new merchant marine. Captain Decker was last in charge of the BUNKER HILL on the all-water route between Boston and New York.

Constitution wharf, Boston, a notable landmark, has been requisitioned by the government as a depot. Until recently the wharf was the terminal of the Merchants & Miners Transportation Co. which has relocated in South Boston.

The tug DE WITT C. IVINS has been sold by the American Agricultural & Fertilizer Co., of Boston, to the Morse Drydock & Repair Co., of New York, for about \$60,000. She was built at Philadelphia in 1909.

Capt. W. M. Ward, of the ill-fated four-masted schooner FRONTENAC has been given command of a four-masted schooner recently completed at Sharps-town, Md., for Baltimore interests.

With machinery deranged, the steamer F. P. JONES, built on the Great Lakes, put into Boston for repairs when bound from Montreal for New York. The ship was caught in ice while trying to cross the Gulf of St. Lawrence in a hurricane and sustained minor damage to deck fittings.

The Lake-built steamer WAR CHANT, ordered by the Cunard Line and taken over by the shipping board, has been rechristened the LAKE CHAMPLAIN. The ship encountered terrific weather that forced her into Boston while bound from Montreal for New York.

Capt. I. L. Evans, of Cleveland, in charge of the Great Lakes free government school in navigation and marine engineering, was the guest at Boston of Henry Howard, director of recruiting for the shipping board, and inspected the training ship CALVIN AUSTIN during a recent practice cruise.

While engaged as a collier, the Dutch steamship NICKERIE ran aground in Boston harbor, damaging 15 bottom plates and breaking several frames. This ship was the first of foreign registry to deliver a coastwise cargo at Boston under operation of the shipping board.

The steam yacht INCA, which was taken over by the United States government during the Spanish-American war and later sold by the government to New York parties, has been purchased by Lufkin & Tarr, Gloucester, Mass., to be used in gill netting. The INCA was built in 1898 by George Lawley & Sons Corp., South Boston. The present owner is said to have paid approximately \$15,000 for the vessel, and the deal was handled by David W. Simpson, ship and yacht broker, Boston.

Gulf Coast Notes

ICE gorges sweeping southward because of rapid rise of the Mississippi river, did hundreds of thousands of dollars worth of damage to shipping on the river from Memphis southward. Five river steamers and a number of smaller boats were crushed between the huge ice floes, until, torn from their moorings, they sank. Some of them were later pulled ashore and saved, but at least four will be practically total losses at Memphis. These are the excursion steamer DE SORO, valued at \$50,000; the government towboat GRAHAM, worth \$27,500; a government grader boat valued at \$37,000, and a government quarterboat, worth probably \$15,000. The excursion boat MAJESTIC and the packets GEORGIA LEE and FERD HAROLD were torn from the Memphis wharves by the ice but fought their way through the broken floes to safe anchorages. Three valuable coal barges belonging to the Western Coal Co. were torn from their moorings and driven down the river, but were rescued. Ice ran further down the river and in greater quantity than in the past 10 years.

Officers of the International Shipbuilding Co., originally the Henry Piaggio Co., of Orange, Tex., but since

extended to several gulf ports, have formed five shipbuilding companies, understood to be subsidiary to the International. Incorporation was made at Gulfport, Miss., but the ships are to be built in Orange, Tex.; Gulfport, Biloxi, Pasagoula and Moss Point, Miss. The firms are: City of Pascagoula, City of Biloxi, City of Natchez, City of Jackson and City of Gulfport Shipbuilding companies. Piaggio's company already has built the CITY OF ORANGE, CITY OF HOUSTON and CITY OF BEAUMONT, ships named for Texas cities.

Heatless Mondays and other coal-saving methods resulted in the speedy coaling of 15 vessels in the harbor of New Orleans at the beginning of the operation of Fuel Administrator Garfield's order. Not a single ship was delayed leaving New Orleans on account of lack of bunker coal.

Hundreds of foreign-born seamen along the Gulf of Mexico coast are hurriedly filing their first papers seeking naturalization in the United States. Collectors of customs are issuing seamen's certificates of American citizenship to those who have filed first papers. This gives all these men the opportunity to continue their work on the coasting, deep-sea and fishing fleets along the gulf, which industries would have been seriously crippled had these Austrians, Bohemians, Czechs and other foreigners been compelled to remain ashore.

The United Fruit Co. soon will be handling the mails between Belize, British Honduras, Puerto Cortez, Honduras, and Puerto Barrios, Guatemala, according to advices received by New Orleans shipping interests from their representatives in Belize. Hitherto mails and passengers have been handled between these points by schooners of uncertain speed and service.

The Atlantic Towing Co., Jersey City, N. J., has filed libel suit for \$450,000 in United States district court at New Orleans, against the steam tanker GUT HEIL, recently raised from the Mississippi river near Baton Rouge, where she was sunk in collision with another tanker in 1912. The tanker, now in drydock in New Orleans, is valued at \$1,200,000, and the towing company wants nearly half a million dollars for its services in the raising of the vessel. Condemnation and sale of the GUT HEIL to satisfy the claim is asked.

The city of Mobile will open bids Feb. 11 for a municipal pier to cost \$600,000. This raises the amount now being invested in harbor improvements in the Alabama port to \$1,000,000.

* * *

James Burns has been appointed harbor master for the New Basin canal, the main waterway connecting New Orleans with Lake Pontchartrain and the Mississippi coast. He succeeds Edward Egan.

* * *

The steam yacht RADHA, which has been in litigation in state and federal courts in Louisiana for several months, has been awarded to the Pelican Oil Refining Co., by Judge Rufus E. Foster, sitting in federal district court in New Orleans, who also issued an injunction against the Louisiana Agricultural Corp., forbidding it to interfere in any way with the work of the oil company in salvaging RADHA. The boat was sunk during the 1915 storm in the river, about 15 miles above New Orleans, and the Pelican Oil Co. started to salvage it. The Agricultural corporation, however, also claimed ownership, alleging that it purchased the yacht from Charles Collins Buck, for whom it was originally built.

* * *

Alfred August Cooley, oldest river steamboatman in Louisiana, if not in

the entire south, died at his home in Abita Springs, La., late in January. Mr. Cooley was 76 years old, and retired about 33 years ago, after 23 years on the river. He was first mate on the famous river steamer KATIE BELLE, when she burned in the river nearly 40 years ago. He was a veteran of the Confederate army in the Civil war.

* * *

Positive action looking toward the development of river front shipbuilding and industrial plant sites was taken in January by the New Orleans association of commerce when it named a committee of three, Ernest Lee Jahncke, W. R. Irby and A. M. Lockett, to obtain concerted action by state and municipal authorities and all civic and commercial organizations, with shipbuilders and property owners, looking to early establishment of more yards in the south. One of the first steps of this committee was the preparation of complete data for presentation to Henry Ford on the occasion of his visit to New Orleans early in February.

* * *

The board of commissioners of the port of New Orleans, of which William B. Thompson is president, has undertaken the construction of a commodity warehouse in the third district, to cost \$1,500,000. Contract was first let for

this building to private engineers, but progress was so slow that the dock board finally decided to take matters into its own hands. The warehouse will be of great aid to the federal government and to shippers generally.

* * *

Capt. Henry T. Boyd, who was in charge of the ANTILLES when the converted transport was torpedoed, arrived in command of a Southern Pacific liner in New Orleans in January. Captain Boyd said he stayed with the ANTILLES when she sank, but was blown back out of the water by the explosion of her boilers. He left New Orleans for Washington to report on the sinking, as he is an officer of the naval reserves.

* * *

An important new navigable waterway for interior Louisiana is assured by the signing of an agreement between the Caddo Parish levee board and state and federal engineers, for commencement of work on the canal within 90 days from the first of January. By the agreement, Twelve Mile Bayou is to be closed and its water diverted through a new canal into the Red river at Shreveport, La. Bids have been advertised, the whole work to cost approximately \$250,000. Necessary funds have been raised and the specifications drawn and approved.

Activities Along the Pacific Coast

WEATHER conditions in the east, preference given government freight, and an enormous increase in Puget Sound's Oriental commerce have resulted in a serious congestion of freight at Seattle and Tacoma. For a time this threatened an embargo. The railroads, however, have decided not to taken this drastic action and every effort is being made to clear the terminals. Shipowners have been accused of giving preference to the cargo paying the highest rates. The situation has brought about many conferences between steamship agents and representatives of the railroads. Puget Sound terminals are crowded and freight is said to be on track several hundred miles in the interior. This situation has not been as serious as at some Atlantic terminals but it has brought local operating officials face to face with a difficult problem. With a large fleet of vessels to clear from Seattle and Tacoma within the next month and the determination of the railroads to handle only such cargo as has export licenses and ship space reserved, it is expected that the congestion will shortly be relieved.

* * *

The Seattle Construction & Dry Dock Co. has just completed a \$100,000 repair job on the Alaska steamer SPOKANE, which was damaged by grounding in British Columbia waters in November. The same plant has just converted the former navy cruiser BOSTON into a commerce carrier and the vessel has been turned over to the shipping board. The former German steamer ANDALUSIA is at the same plant, undergoing extensive repairs and the steamer NANKING, will soon be ready for delivery to the

China Mail Co. The new owners will operate her between San Francisco and Oriental ports.

* * *

The new steamer ANYOX, recently completed for James Griffiths & Sons, has already proved a splendid vessel for the ore trade between Seattle, British Columbia and Alaskan ports. The ANYOX recently returned from a voyage to Valdez, in which she proved her seaworthy qualities. The ANYOX was designed for ore-carrying and has exceptional power for towing. In both features the new vessel has surpassed expectations.

* * *

Illustrating the demand for trans-Pacific tonnage, the little sailing schooner HOKO MARU, only 58 tons net, arrived recently from Kobe with about 75 tons of general Japanese cargo. The vessel made the run across in 56 days and within a week was dispatched on the return. This is the first instance in the history of Puget Sound shipping that a Japanese sailing vessel has carried general cargo to Seattle.

* * *

Announcement has just been made that the express liners PRESIDENT and GOVERNOR are to be returned to the Pacific Steamship Co. in about a month, whereupon they will resume service between Puget Sound and California ports. These fast steamers operated on this route for 10 years until last November when the shipping board diverted them to the San Francisco-Honolulu route to relieve the congestion. They will be replaced on the latter trade by freighters to be diverted from Alaska.

Conditions favorable to speedy shipbuilding have attracted attention to Puget Sound and the shipping board has just awarded contracts for 14 additional 8800-ton steel freighters and for eight wooden hulls to local yards. The steel steamers will be built by the Skinner & Eddy Corp., and the wooden vessels by the Puget Sound Bridge & Dredging Co. This brings the total of government ship contracts now held by Seattle plants to 65, 47 for steel ships and 18 for wood. In other words the tonnage may be expressed as 406,000 steel and 63,000 wood. The Seattle Construction & Dry Dock Co. some time ago received a contract for 10 7500-ton steel steamers.

* * *

For the first time in the history of Puget Sound a wheat-laden ship has arrived. This is contrary to precedent for Seattle and Tacoma have for 30 years been large exporters of wheat and barley. The arrival is the Belgian bark L'AVENIR, which brought 3200 tons of wheat from Melbourne, Australia. It is understood that this cargo is to be sent to Europe.

* * *

On Jan. 19, Vancouver, B. C., celebrated the launching of the largest vessel ever built in Canada when the 8800-ton Norwegian steel steamship ALASKA went into the water from the yards of John Coughlan & Sons. This is the first steel vessel from this yard which has the contract for several others of the same size. The ALASKA is a vessel of the Niels-Nielsen type.

Red Hot Tips From the Trade

Pertinent Suggestions and Personal Gossip

THE Goldschmidt Thermit Co. and the Goldschmidt Detinning Co. have merged. The new concern will be known as the Metal & Thermit Corp. The offices will continue to be located at 120 Broadway, New York. There will be no change in the operating policies of the two companies. The Goldschmidt Thermit Co. has been prominent in the marine field for a great many years. Thermit welding, which is distinct from either oxy-acetylene or electric welding has found extensive application in shipyards both in this country and abroad. The thermit process is particularly well adapted for making heavy repairs on stern frames, rudders, etc.

Tool Men Promoted

R. S. Cooper, vice president of the Independent Pneumatic Tool Co., manufacturer of pneumatic tools and electric drills, assumed the duties of general sales manager in addition to those of vice president on Feb. 1. His headquarters are at the general offices of the company, Thor building, Chicago. For many years Mr. Cooper was manager of the Independent company's eastern branch in New York City. R. T. Scott, formerly manager of the Pittsburgh branch, has been appointed eastern manager with headquarters at 170 Broadway, New York. H. F. Kinney has been placed in charge of the company's branch office at Pittsburgh.

Boat Hinges

"Hinges" is the title of a cloth-bound catalog recently issued by the Griffin Mfg. Co., Erie, Pa. The catalog contains 78 pages and is well illustrated. It is stated that the company operates its own rolling mills and therefore is in a position to furnish customers with fittings of proper quality in the minimum amount of time. The catalog contains a list of finishes used on various fittings and the comparative lists of two other well known manufacturers. Two indexes are included, one numerical and the other alphabetical. In all, 97 articles are listed, including several kinds of hinges, belts, braces, brackets, hang-

ers, stops, hasps, handles, mending plates, draw pulls, etc. A wrought-steel, loose-pin reversible butt, that is made in a substantial manner, and which is furnished in 10 different styles, is one of the company's products that appears to be of more than usual interest.

Releasing Device

James R. Raymond, New York City, has issued a booklet describing a novel releasing device for launching ships' boats at sea. The device is said to be automatic in action and to hold the boat securely until water-borne. The first four pages of the booklet are devoted to a discussion of safety of life at sea and the necessity for launching life boats quickly from a sinking ship is graphically described. The booklet contains 10 illustrations and describes the device fully. Complete instructions for installation and operation are also included.

Ship Instruments

The Cummings Ship Instrument Works, Boston, has issued an illustrated catalog describing its products. These include torsion meters for determining the power of marine turbines, single, two and three-shaft averaging revolution counters, electrically controlled revolution counters, revolution timers, tell-tales, engine logs, stop clocks, log stands, log control valves, direction indicators, and indicator pumps. On the page opposite each cut is a concise description of the article illustrated. It is pointed out that with the counters all motion is transmitted by gearing which, it is claimed, insures durability. It is stated that each instrument is designed to meet the requirements on the particular ship on which it is to be installed.

New Fillet Material

The Tresco Mfg. Co., Cleveland, has recently placed a novel fillet material on the market. This fillet is designed for use in the pattern shop on wooden patterns. It is made of a specially treated paper and it is claimed that its porous nature readily absorbs glue, which characteristic insures a close-fitting contact, thereby eliminating the ob-

jectionable feature of curling. It is said that this material is cheaper than leather, more pliant than wood and that it is very easily applied.

Ship Paint

The Amalgamated Paint Co., New York, has published a 30-page booklet which describes its products and the purposes for which they are intended. A large part of the booklet is devoted to a list of vessels the bottoms of which have been painted with the company's products. This list includes transports, ferryboats, submarine mine planters, passenger and freight steamers, cable steamers, lighters, gunboats, and battleships. The tonnage and owner's address of each vessel is also given.

General Equipment

George B. Carpenter & Co., Chicago, has issued a 1084-page catalog of general supplies and equipment for use on land and sea. The catalog is illustrated and complete specifications are given of each article listed. Tables of useful information covering 28 pages are also included. In this section are described the properties of water and steam, electrical units, weights of various substances per cubic foot, the melting points of various metals, rules for computing horsepower, information on hardening and annealing steel, tables of weights and measures, wire-gage standards, sizes of tap drills.

Marine Decking

A new type of marine decking has been developed by the Neolithic Products Co., Philadelphia. It is not a linoleum, but is a deck covering used on steel sheathing in place of wood. It also may be employed to cover old wooden decks. It is a magnesium-oxychloride composition. It may be laid in any thickness from $\frac{3}{4}$ inch up. This decking weighs 56 pounds to the cubic foot. It is a dense composition, watertight and fireproof. It is said that it does not get slippery, and it is more than ordinarily resilient. This decking was recently installed on the four steamers built by the Pusey & Jones Co., Wilmington, Del., and on the Pennsylvania railroad ferries in New York.

Equipment Used Afloat and Ashore

Course Control Apparatus—Submarine Cots—Drift Bolt Driver

A COURSE control apparatus which, it is claimed, eliminates dead-reckoning anxieties while attempting to keep out of the path of torpedoes in submarine danger zones, is being handled by A. M. McGray, New York. The device is for use when running a zig-zag course.

The apparatus is mounted on a board 2 feet square. In the center of the board is a clock. At either side of the clock a number of green and red lamps are arranged alternately, together with a series of alternate green and red cards. These correspond to the starboard and port sides of the vessel. Above the clock is a little board on which is plotted a zig-zag course that it will take the vessel an hour to cover. In the chart shown in the accompanying illustration, the straight line represents a course which may be called the true south for the sake of explanation. Assume that the ship commences her zig-zag course at, say, eight bells, at which hour her helm is thrown over and her course altered 30 degrees to starboard of the true course. She continues on this course until 7½ minutes past 12 o'clock, at which time the minute-hand of the

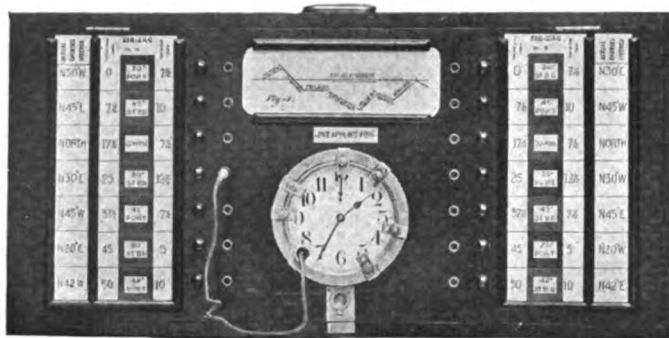
again on her true course.

In this particular zig-zag, a 12-knot ship loses 2 knots of distance in one hour. This represents, roughly speaking, a loss of 50 miles in 24 hours. When the bell rings for a change of course, the navigating officer on the bridge pulls out the plug in the circular ring surrounding the clock

is handled by two men, a second handle being clamped to the center of the tool. An inside trigger controls the operation, and it is said that both light and heavy blows can be obtained at the will of the operator. With this device, it is claimed, a large amount of manual labor is saved inasmuch as the device strikes many blows while a man with a hand sledge would be preparing to strike one.

Submarine Cots

Deck space aboard a submarine is valuable owing to the comparatively small size of this kind of craft, together with the large amount of machinery necessary for operating these vessels. Thus many ingenious devices have been resorted to to conserve deck space as much as possible. The accompanying il-



ZIG ZAG COURSE CONTROL APPARATUS

and moves it to the next hole corresponding to the change in course. The bell continues to ring until the change is made, so that errors are practically eliminated.

The course described is for explanation only. The navigating officer can plot out any course he desires in a few minutes' time. After this is done, he merely has to shift the plug from one hole to another around the outside of the clock.

It is pointed out that the apparatus should preferably be installed where rain cannot wet the clock face as this would cause a short-circuit. The wheelhouse is recommended as a better location than the open bridge.

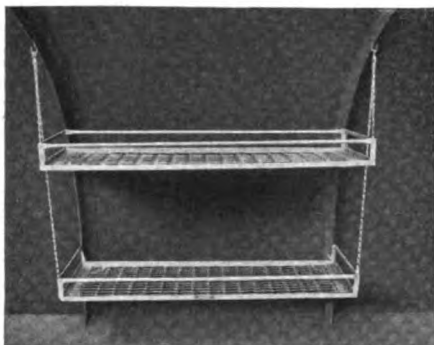
Drift Bolt Driver

The drift-bolt driver shown in the accompanying illustration has been developed by the Ingersoll-Rand Co., New York. It was designed for driving drift bolts in ship construction, dock building and similar work. The tool is said to be of substantial construction. It has a renewable hammerblock bushing and a spring-retained front head to absorb shock. The cylinder, front head, hammer block, bearings, piston, cylinder cover, bolts and throttle lever are made of drop-forged steel. All wearing parts are heat-treated. The overall length of the tool is 25 inches and its weight is 65 pounds. It is claimed that the machine will drive bolts up to 1½ inches in diameter and 10 feet long. In operation, the device



A NEW DRIFT-BOLT DRIVER

Illustration shows a form of double-swinging cot recently developed by the Englander Spring Bed Co., New York, for installation in submarines of the United States navy. The cots, which are suspended by means of chains, are hinged at the back. This permits them to be folded into small space when not in use. The company recently secured a contract from the United States government for this type of cot.



SUBMARINE COT

clock makes an electrical connection that rings a bell. The helm is now thrown to starboard and the ship put on a course 45 degrees to port of the true course. This course is maintained for 10 minutes when another electrical contact is made which again rings the bell. The ship is now turned the necessary number of degrees to starboard until she is on a southern course, parallel to her true course. There are seven changes of course during the hour, at the expiration of which time the vessel is